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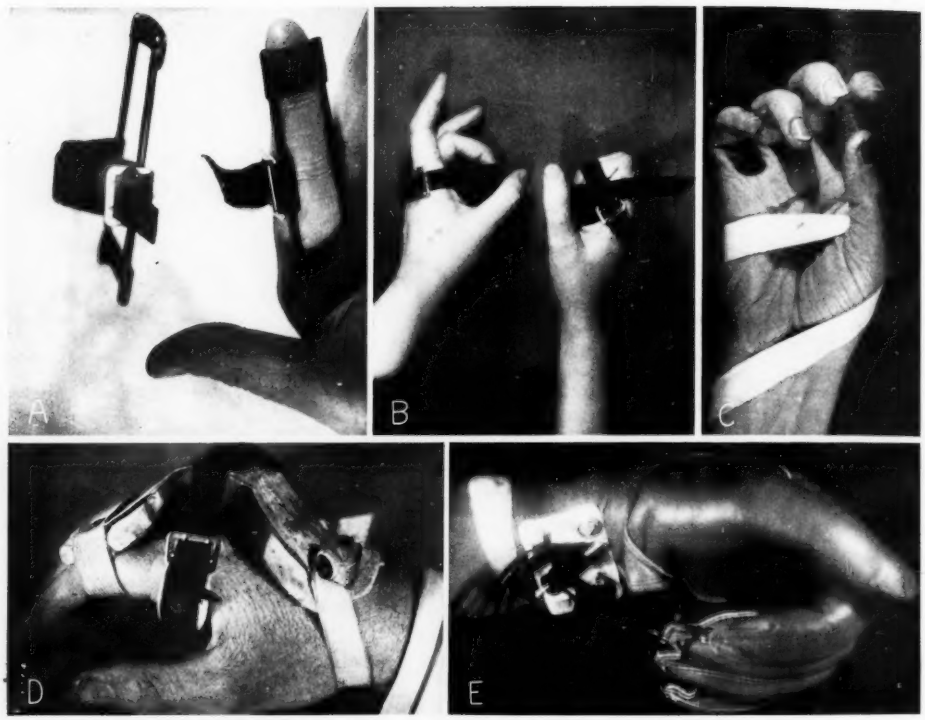

FIG. 17. TYPES OF SPLINTS USED BY AUTHOR.

A, "Safety pin" splints used to extend a finger or thumb, or to straighten a fractured phalanx. The strap draws the finger forward between the two rods.

B. Web belts and buckles used to draw the finger joints into flexion by slow, mild, continuous traction. Various other ways of applying the straps can be used.

C. Method of maintaining opposition of thumb to fingers in median palsy. The thumb is drawn toward the pisiform bone by two arms of a strip of adhesive that grip around the hand and forearm. The thumb is pulled along the line of the resultant of these two forces.

D. Splint used to flex the proximal finger joints. A metal bar crosses under the heads of the metacarpals and by tightening the belt and buckle which are attached to the bar the desired strain is put upon the finger joints.

E. Method used to flex further the proximal finger joints after using splint shown in *D*, and of flexing the middle finger joints. The cords pulling from the finger ends are made fast to a line-cleat riveted to the glove at the wrist. The cleat will open to allow removal of the glove.

Reconstructive Surgery of the Hand.—Sterling Bunnell.

SURGERY, GYNECOLOGY AND OBSTETRICS

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RECONSTRUCTIVE SURGERY OF THE HAND

BY STERLING BUNNELL, M.D., SAN FRANCISCO, CALIFORNIA

INJURIES from manual labor are usually of the hand, and so it is that hand injuries constitute by far the largest part of industrial accident cases. As a number of these result in permanent disabilities there are in every large city thousands of crippled hands in need of repair. If a worker be entirely dependent on manual labor for his livelihood, his earning power is seriously impaired when his most valued member is crippled.

When we consider what a wonderfully perfected piece of mechanism the hand is, it is not surprising that successful reconstruction of it by surgery is unusual. Much, however, can be done if one will give the time, care and patience. The usual surgical procedure is too rough, so it is necessary in this work to use as nearly as possible an atraumatic technique.[1]

In hand reconstruction certain main principles must be kept in mind. The rest depends on a host of tiny but important details.

MAIN PRINCIPLES

The wrist and fingers must first be put into functionating positions. That is, the wrist should be cocked up in extension and the fingers should be partially flexed and especially in their proximal joints. The thumb should oppose the fingers. A hand with a straight wrist, with extended proximal finger joints, and with the thumb at the side of the hand, is practically useless. While the case entrusted to our care is undergoing healing from infection or injury, we will be negligent if we do not maintain these functionating positions.

Joints must be mobilized before tendons are repaired or no motion will result. We cannot expect a newly repaired tendon to move a stiff joint; nor should we repair a bone, and at the same time a tendon or joint. The former demands postoperative immobilization, and the latter mobilization.

In all dissections of the hand it is essential, in order to protect anatomical structures, especially nerves, to dissect with accuracy and to avoid the trauma of sponging, to operate under the ischæmia of a tourniquet, such as a blood-pressure band. Too long an ischæmia will provoke a generalized tissue reaction, which results in a degree of firm induration of the parts—an hour is safe; 2 hours gives some reaction. The pneumatic blood-pressure band will not cause paralysis. After the arm has been held vertically long enough for the veins to collapse, the band should be pumped up very rapidly until over the systolic pressure so that the veins will not have time to refill. For this speed a bicycle pump excels a bulb. Local anæsthesia, and especially with adrenalin, is best avoided as it lowers the resistance of the tissues. The tissues must have maximum vitality for healing.

After trauma, infection, or operation the tissues are usually densely indurated. A second operation on such tissues will result in the summation of scar tissue and so had best be

[1] An essential in reconstructive surgery—"atraumatic" technique. California St. J. Med., 1921, May.

a *b* *c*

Fig. 1. Mrs. J. D., age 48. Following a severe encephalitis, the hand was drawn by the unequal pull of the muscles into the extreme contracture of wrist and fingers shown in *a*, which had existed 3 years.

Treatment. By the principle of slow, mild, steady traction the joints were gradually straightened and the flexor muscles stretched. In *b* is shown the commencement of treatment, using an inverted cock-up splint, with metal extension distally, for traction cords. Various other splints were used and finally the joints were mobilized under anæsthesia. In *c* is shown the extension obtained in 10 months. Strength returned in the extensor muscles which had been overstretched and excellent function of the hand and wrist was obtained.

delayed a few months. The final result is not obtained until after the softening up process has taken place. This often takes a year.

I have been disappointed with the results of physiotherapy as usually practiced, and have far more faith in certain exercises, the actual use of the member, and last, but not least, the time factor.

For most reconstruction, special splints must be used. These the surgeon, himself, should make to fit the case. They are usually made of metal. They should be boiled up for application at the end of the operation.

It is most important for later reference to make a complete record of a case before the repair is attempted. This should consist of photographs showing limits of motion, measurements of joint motion, condition of the bones, joints and tendons, amount of loss of nerve function, both motor and sensory, presence of contractures, degree of induration of tissues, and finally the strength and practical function of the hand. By establishing a record of the exact condition before repair, the degree of improvement in the final result can be ascertained.

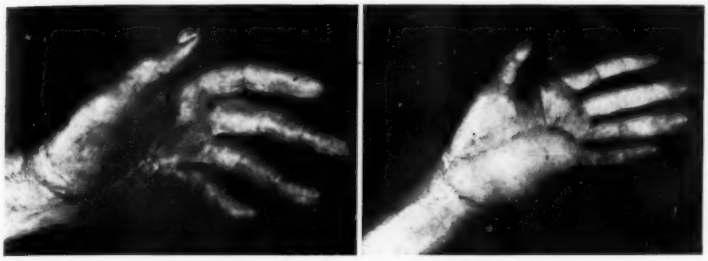
MOBILIZING JOINTS

In examining a hand if we request the patient to flex his fingers fully and to maintain the flexion and then we find that we can passively flex the fingers still further without encountering resistance, we know that in his case the tendons are more to blame for his lack of power of flexion than are the joints. If, however, we cannot passively flex the fingers further than he can do so actively, we know that in this case the joints are more at fault than are the tendons. If we can bring the joints into

a *b* *c*

Fig. 2. E. M., age 7. At the age of 14 months his chair fell forward and both hands rested on a hot stove, resulting in the deformity seen in *a*. The digits are at their limit of extension.

Operation. Two tubular pedicles were prepared as in *b*. The scars on the moderately contracted fingers were relieved of their tension by cutting a series of V's along them and suturing them in Y's. The large keloid scars were excised and the areas covered with good skin from the pedicles. The hands were held in extension by metal splints The result immediately after the completion of the operations is shown in *c*.



a *b*

Fig. 3. P. S. Seven months previously his hand was caught and held by a hot metal roller, resulting in a deep contracting palmar scar adherent to the tendons and preventing extension of the fingers as shown in *a*.

Operation. The scar tissue was excised and the denuded area so left was covered with skin from a tubular pedicle from the chest, as shown in *b*.

functionating positions, so that the hand can be used, much will have been accomplished, as the mere use of the hand, together with the time factor, will greatly increase the range of motion.

When a hand has suffered a severe traumatism or an infection, and especially if splinted during the recovery, the tissues about the finger joints, as well as all of the tissues of the hand, have become thickened and less flexible and we find much loss of ability to flex the fingers. It is frequently found after palmar infection that the metacarpophalangeal joints have become permanently stiffened in the extended position and that the two distal joints of the fingers have become flexed. This is the position assumed, because the same mechanics take place as in paralysis of the ulnar nerve. The small hand muscles normally flex the proximal joints and extend the distal two joints, and when bathed in palmar infection they temporarily cease functionating and the fingers assume the opposite position, just as they do in ulnar paralysis.

Stiffened finger joints may be mobilized by using the principle of slow, steady, mild traction; much as the dentist draws into line malplaced teeth. If the traction is too severe the tissue strain thus produced will cause arthritis and pain. The restraining tissues must not be merely stretched, as this only further stiffens the joints by provoking tissue reaction. The tissues must be held on a mild stretch steadily for weeks until they grow longer. The pump

a *b* *c* *d*

Fig. 4. L. M. Ten months previously the hand was burned by being caught in a mangle. The distal part of the palm, including the palmar fascia, sloughed, and the area had been later covered by a poor pedicle skin graft. The hand as seen in *a* and *b*, shows flexion and extension much limited. There is a stellate contracting keloid in the palm drawing together the thumb and fingers. The grafted skin is dome-like and does not stand work. The flexor tendons are held by adhesions in the palm and fingers.

Operation. All of the scar tissue was dissected out of the palm, including that which matted together the deeper structures. The tendons were stripped well into the fingers and mobilized. A tubular pedicle which had been prepared and taken from the abdomen was used to furnish good skin for the palm. A splint held the fingers in extension. The result obtained in flexion and extension of the fingers and in new skin in the palm is shown in *c* and *d* taken 6 months later.

a *b*

Fig. 5. P. W. Age 21 months. Three months previously the hand and forearm were burned by hot coals, resulting in keloid formation and contracture, as shown in *a*.

Operation. The scar tissue was excised and the hand was placed in a previously made metal splint, which held the thumb, little finger, and wrist in extension. The skin of the upper half of the forearm was extensively undermined and the edges were drawn together leaving a linear scar on the dorsum not shown in *b*. A whole thickness free graft of skin from abdomen was used to cover in the little finger and part of wrist. This later became pigmented. The thenar eminence was closed by sliding flaps and the lower half of the forearm successfully by a Thiersch graft from the mother's leg. Except for the pigmentation of the Wolfe grafts, which does not occur in pedicle grafts, a good result was obtained, as shown in *b*.

handle method traumatizes microscopically and results in increased scar contraction of the restraining joint capsules. Elastic traction by its vibratory fluctuation traumatizes. Steady, firm traction is preferable. It is well to remove the traction for short intervals several times a day, to exercise the joints and bathe the hand in hot water.

If adhesions prove too unyielding for the slow traction method, the joints may be flexed under anæsthesia and held so until the traumatic reaction is over.

The wrist joint, which tends to be straight, can be drawn into the extended position by the Jones cock-up splint. This is the position in which a wrist is most useful, and in which we generally use it.

The metacarpophalangeal joints can be flexed in two stages. The first is by a padded metal splint on the back of the hand bent at the knuckles (Fig. 17, *D*). It presses the fingers and wrist palmarward, while a palmar cross-bar under the heads of the metacarpals draws these joints backward. As an encircling web belt and buckle are tightened the joints are made to flex. After about a week, when partial flexion has been obtained, the joints are bent still further by means of a kid glove (Fig. 17, *E*). The finger joints are drawn into flexion by strings from each finger tip, which are made fast to a line cleat that has been riveted to the wrist of the glove. To flex the finger tips still further a flattened bracelet about the hand will hold the strings into the palm. Individual fingers may similarly be flexed by fastening the string to them with adhesive and anchoring it to a web belt about the wrist by means of a safety pin used as a line cleat.

To flex the distal finger joints, a narrow web belt may be made to encircle the proximal and distal finger segments (Fig. 17, *B*). A nail can be passed under the belt to keep it from slipping off the finger. This belt may include all of the fingers, and another belt may encircle the middle segments and the dorsum of the hand for flexion of the proximal joints also.

If the finger joints have ankylosed too firmly they will not yield to mild force. Greater force will result in evulsing two discs of cartilage from the proximal joint surface.

If the extension of the fingers is desired and the flexion is extreme the finger tips can first be drawn out by tape loops on traction cords from a distal metal extension of a Jones cock-up splint (Fig. 1, *b*). If flexion is not so extreme they can be still further extended by drawing the fingers into small curved metal gutter splints on their volar surfaces by belts encircling at their middle joints. Another way is to draw the fingers into extension by tape loops from a splint belted along the dorsum of the hand and forearm.

The final straightening of the fingers can be done by what I call the safety pin splint (Fig. 17, *A*). It consists of two rods and two ribbon cross pieces of sheet metal soldered to them and is placed on the volar surface of the finger. A web belt over the dorsum of the finger is looped about each rod and draws the finger forward between the two rods until it is straight.

a *b* *c* *d*

Fig. 6. R. L. A year previously the hand was caught up to the wrist between two steel rollers, causing multiple fractures, exposing the flexor tendons and tearing away the thenar muscles. The wound healed in 6 months and physiotherapy was used for 5 months. The hand was completely disabled. He could not grasp an object; his only way of holding one was by pressing it between his hand and something else. The wrist was flexed out of use and the proximal finger joints were extended out of use. A broad keloid extended from the distal end of the palm up the forearm for 6 inches, holding the wrist in flexion and the thumb in adduction. The finger joints were quite stiff. The thumb lacked an inch of touching any finger. In *a* and *b* is shown the extent of flexion and extension.

Operation. After bringing the proximal finger joints into flexion by the slow traction method (Fig. 17, *D* and *E*), the scar tissue was dissected from the palm and forearm, and from between the tendons, nerves, and blood vessels, which were matted solidly together. A gap of 1¼ inches which was found between the ends of the nerve to the third cleft was bridged by a free graft from the sural nerve. The flexor tendons freed from scar were made to pull the fingers into flexion. The wrist was put into extension and the thumb in abduction. The large skin defect was covered by a tubular pedicle from the chest. *c* and *d*, taken 4 months later show fairly good extension and flexion of the hand. The thumb touched every finger. Sensation returned in the third cleft. He returned to his work.

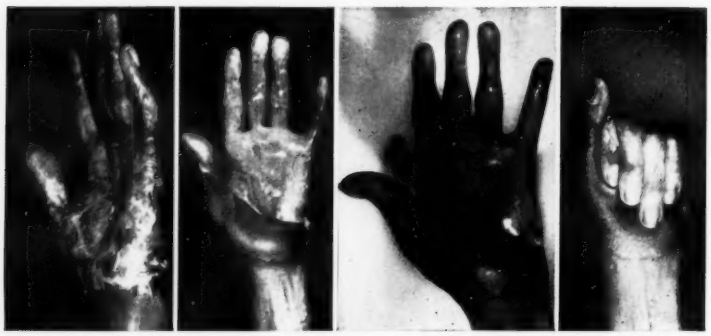
This splint is also useful in straightening fractured phalanges.

In some cases the joints are limited in their movements by adherent tendons, or scar contractures, and it will be necessary to liberate or excise these before the joints can be mobilized. The distal end of a flexor sublimis tendon, severed at the base of a finger, will

a *b* *c* *d*

Fig. 7. G. T., age 8. Scar contracture due to burn from stove at age of 2. *a* and *b* show limit of extension of the thumb and fingers.

Operation. The scar tissue was excised; the hand was placed in extension on a splint and a skin graft from a tubular pedicle on the chest was used to cover the denuded area. *c* and *d* show result.



a *b* *c* *d*

Fig. 8. R. W. (colored). Fourteen months previously the hand was badly burned in a gasoline explosion, taking 4 months to heal. A stiff hard keloid covers the base of the thumb and palm, drawing the thumb in adduction, preventing flexion of the wrist and causing pain, as shown in *a*. The little finger had a slight contracture by a band running in the wrist. The finger joints were stiffened so that the fingers lacked an inch of touching the palm.

Operation. A zigzag plastic relieved the flexion band of the little finger. The keloid over the thumb and base of the palm was excised and in its place was sutured skin from the side of the chest from a previously prepared tubular pedicle. The finger joints were mobilized by the slow traction method. In *b* is seen the skin graft in place, but the linear scar running to the thumb being under some tension is forming a keloid and adducting the thumb. This was excised and the tension was relieved by a zigzag plastic which allowed the thumb to abduct, as shown in *c*. Little finger is straight. In *d*, taken 7 months after operation, is seen degree of flexion and absence of keloid.

become adherent from lack of movement and thus hold the middle joint in flexion. Following tenosynovitis a finger may be held resistantly in flexion by the adherent flexor tendons acting as a bow cord. Adherent extensor tendons will prevent flexion. If superficial skin on the dorsum of the hand or finger is preventing flexion, the skin can be cut in several places transversely. On fastening the fingers in flexion these incisions will gap and the defects can be covered by Thiersch grafts. If the cicatrices are greater pedicle grafts must be used.

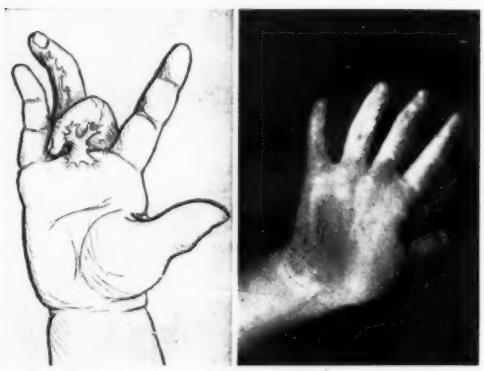


Fig. 9. B. S., age 3. The deformity shown in *a* resulted from two previous operations for webbed fingers.

Operation. The contracting scars were excised and the fingers were overextended and placed on a splint. The large denuded areas so left were closed by a plastic on the ring finger and by whole thickness free grafts of skin from the abdomen on the long finger. The result is shown in *b*, taken 4 years later. The hand could be completely flexed, all skin is soft, but as usual there is slight pigmentation in Wolfe grafts.

A hand that can be but partially flexed may, when used, cause pain whenever the limit of flexion is reached and so prevent the person from working. If such joints be drawn into full flexion and held there until by growth there is no more tension the condition will be relieved.

A flat hand is sometimes seen due to flat splinting. Here the curves of the transverse carpal and metacarpal arches have been straightened; this tilts the angles of the axes of the proximal finger joints and the carpometacarpal joint of the thumb, so that the normal convergence of the finger tips in flexion will be lost and the thumb will no longer oppose the fingers. The tendons will then be

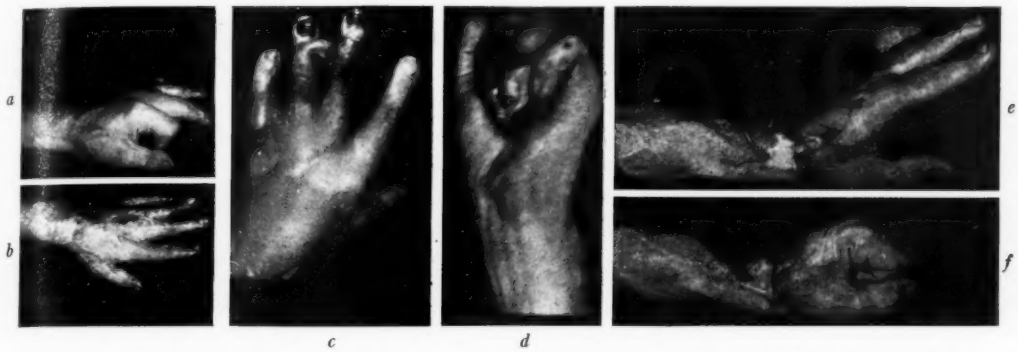


Fig. 10. C. P. Seven months previously hot lead ran over the left hand and forearm, resulting in a tough thick keloid over the dorsum of fingers, hand, and forearm, and in webbing of the fingers for one and one-quarter inches beyond the knuckles. The movements of the wrist are much limited, the thumb is held in adduction and extension, and the fingers are drawn into extension. The last three fingers are covered with thin red scar adherent to bone and tendon and preventing motion of the joints. The nourishment of the hand is poor because of the ischæmic effect of the contracting scar. *a* shows the inability to close the hand and *b* the condition of the hand before operation.

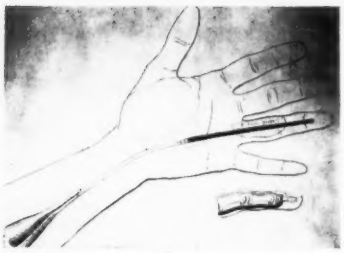
Operation. The scar tissue was excised and by a series of tubular pedicle skin grafts from the chest was replaced by good skin. *c* shows the method of "waltzing" a pedicle, originally from the chest, from the ring to the long finger, resulting in the flexible skin and joints shown in *d*. *e* and *f* show the degree of function gained. All joints now have good range of motion. The hand and forearm are covered with flexible skin throughout and good nutrition has returned.

pulling at a mechanical disadvantage and pain and weakness will result. A corrective strapping for this condition is the one described above to produce opposition of the thumb (Fig. 17, *C*).

FLEXION CONTRACTURES

Burns, infections, or extensive injuries often leave contracting keloid scars, which draw joints into extreme positions and limit their motion. For these radium and X-ray, in my experience, have proved unsatisfactory, but good results are obtained by complete excision of all the scar tissue, both deep and superficial, followed by tubular pedicle skin-grafting. A tubular pedicle is previously prepared. This is usually on the side of the chest and care is used to make the direction exactly in line with the wrinkles of the skin. This leaves a less conspicuous scar. Sometimes the pedicle is made in the pectoral or deltoid region or on the hand itself, as the patient can then be less tied up than when the chest is used. After making two parallel skin incisions a ribbon of skin is lifted up and sutured into a tube with the epidermis outside (Fig. 2, *b* and Fig. 11, *a*). The surrounding skin is then widely undermined and the incision is closed without tension under the pedicle. There will then be no raw area, so the work can all be aseptic. After wearing this "shawl strap" 2 weeks or more the scar tissue is removed from the hand, the joints are fully bent in the opposite direction, cutting the capsules if necessary and the hand is held in this position by a splint of metal with web belts and buckles that has been made for the case and sterilized by boiling. The pedicle is severed from one end and enough of it is opened out to cover the denuded area. The core of the pedicle and its longitudinal scar are removed and the skin flap is sutured in place on the hand under normal skin tension. The hand and arm are held in place by adhesive plaster and guy ropes, so placed that all possible pull on the pedicle is avoided. The pedicle should be made long enough to give freedom of motion and to allow the patient to be ambulatory. After 2 weeks the hand is freed by severing the pedicle and the ends of the pedicle are trimmed off and the skin is sutured into place. Slight infection and separation is often encountered at the angles of the pedicle. This can be avoided by so cutting the pedicle that a triangular flap of skin forms the angle itself and by daily applying to the suture line a 2 per cent ammoniate of mercury ointment.

a *c* *d*



b

Fig. 11. C. J. J. An infection 5 months previously in the sheath of the flexor tendons of the ring finger which was drained through a median longitudinal incision in the base of the finger resulted in loss of the flexor tendons and in the scar contracture of the finger which limits the extension, as shown in *a*.

Operation. The scar was removed from the volar surface of the finger together with the remains of the flexor tendons, the finger was straightened on a splint and the denuded area was covered by a skin graft from the tubular pedicle in the pectoral region shown in *a*. Four months after good skin was supplied, a new flexor tendon was transplanted into the finger from the flexor sublimus of the same digit, which was removed from the forearm. In the palm it was sutured to the tendon of the flexor profundus, and distally it was fastened through a drillhole in the distal phalanx to the insertion of the extensor tendon, as shown in *b*. *c* and *d* taken three months later show the result. Soon practically normal function will be obtained.

a *b* *d* *e*

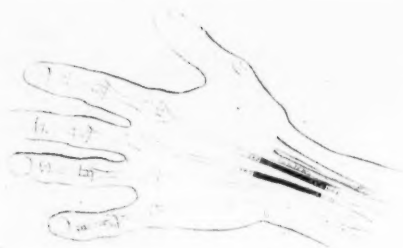
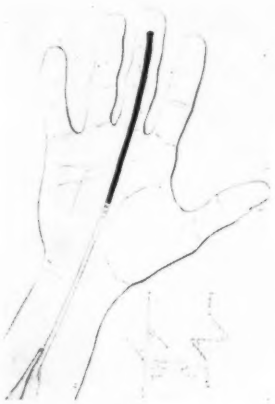


Fig. 12. E. L. E. Two months previously an axe flew off its handle and severed the extensor tendons of the index and long fingers and the extensor carpi radialis brevis. Infection followed leaving the rest of the dorsal tendons bound in scar tissue. Extension of the fingers was much limited as shown in *a*, and flexion was prevented by the attachment of the extensor tendons in the scar, as shown in *b*.

Operation. The scar was excised and all of the extensor tendons of the wrist and fingers were dissected from the dense scar tissue. The severed extensor carpi radialis brevis was sutured together. Between the severed ends of the extensor tendon to the index and long fingers was a gap of 1½ inches due to sloughing of the tendon ends. These two gaps were bridged with free tendon grafts from the palmaris longus, with its paratenon fat about it, as in *c*. The function 4 months later is shown in *d* and *e*.

a *b* *d* *e*



c

Fig. 13. J. D. T. Fourteen months previously the long finger was caught between two wrenches. A severe tenosynovitis followed with middle palmar space infection resulting in adherent flexor tendons and a contracture of the long finger. The finger had been further damaged by an operation in which the ill-advised median longitudinal incision was used and a tendon-lengthening operation was done within the finger by splitting it diagonally and resuturing. This merely added more scar tissue in the finger. In *a* and *b* are seen limits of extension and flexion in the finger when coming for repair and the usual result of the median longitudinal incision.

Operation. The scar contracture along the finger was excised and the incision was fashioned into a zigzag lein to relieve tension. The damaged flexor tendons were removed from the finger entirely and in their place, sutured to the profundus tendon in the palm, a free graft of the sublimus tendon was substituted. The sublimus muscle was sutured to the profundus for added strength. See diagram *c*. In *d* and *e* is shown the resulting function.

Good tactile sense is acquired in the graft in several months.

If the contracting scar is very superficial and there are soft tissues underlying, a Thiersch graft may be used instead of a pedicled one. If the contracting scar is very narrow, it may be excised and by making parallel oblique cuts an inch or so apart alternately into each opposite skin edge, undermining well and transposing the pointed skin flaps, the resulting incision can be converted into a zigzag line, which will, when it later contracts, merely pull straighter and not cause contracture (Fig. 13, *c* and Fig. 8, *c*). This is the best method of removing a short web between fingers, but in this case the plastic is done in three dimensions.

In all contractures in the palm it is best to remove the palmar fascia. Dupuytren's contracture can readily be corrected by the above method and here the two lateral bands of contracting tissue must also be excised from the fingers distally to beyond their middle joints. Foci of infection should also be removed in this case, because of their rôle in the etiology.

Keloid formation is racial, but is also due largely to tension and usually when a keloid is excised and all tension is removed, it will not reform. It is surprising how a wide keloid scar will often soften up if a soft pedicle skin graft is made in it or across the line of tension. Scars should, wherever possible, be placed crosswise to the lines of tension.

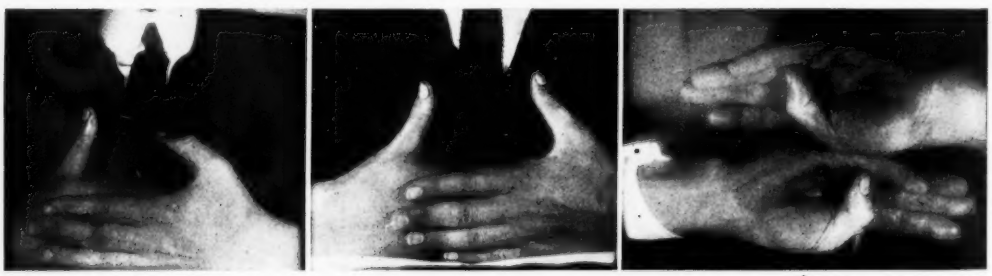
INCISIONS

The median longitudinal incision is the one to be most avoided whether in the wrist, palm, or fingers, as it leads to flexion contracture. It

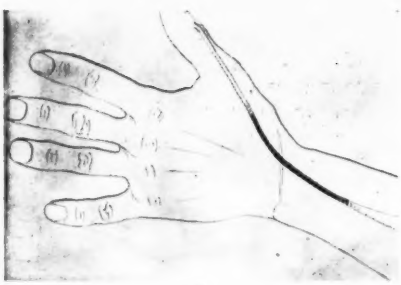
a *b* *c* *d*

Fig. 14. C. B. A buzzsaw amputated the ring finger and severed the extensor tendons of the three remaining fingers in their proximal segments. In *a* is seen the resulting limitation of power of extension. The difference in the positions of the index and long fingers is due to the severance in the long finger of only the central portion of the tendon allowing lateral portions to pull around the middle joint and extend the distal joint. In *b* is shown the lack of flexion as checked by the extensor tendons which are adherent in the scars.

Operation. The scars across the backs of the fingers were excised and the severed ends of the extensor tendons were freed of scar tissue and sutured together. The extensor tendon of the index finger was so adherent that a free graft was made sheath-like about it for its full length in the finger from the specialized paratenon fat from over the triceps tendon. Later as the fingers still could not be flexed completely the flexor tendons of the amputated ring finger were removed from the palm. They had become adherent to the stump and so prevented the rest of the flexor tendons from being pulled upon by the flexor muscle as in the case shown in Figure 21. Normal function was restored to the hand, as shown in *c* and *d*.



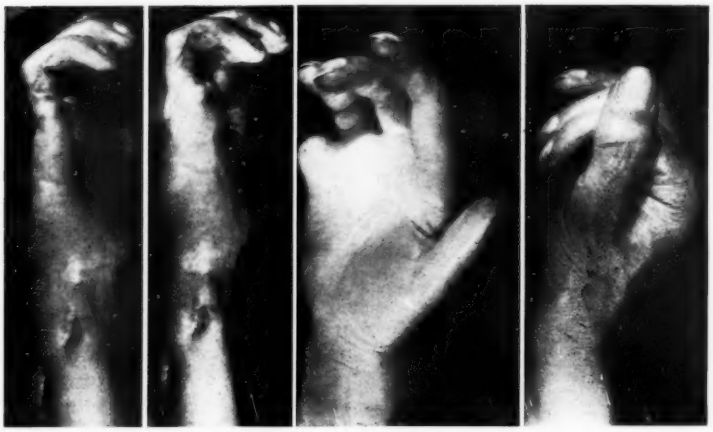
a *c* *d*



b

Fig. 15. E. L. J. Three months previously the tendon of the extensor longus pollicis was severed in a laceration from a broken bottle across the dorsum of the wrist. An infection resulted and about 2.5 inches of the above tendon sloughed out. The resulting inability to extend the thumb is shown in *a*.

Operation. The scar of the laceration and the deeper scar tissue were excised. To bridge the deficiency in the tendon of the extensor longus pollicis a 2.5 inch length of the palmaris longus tendon was used as a free graft as in diagram *b*. The resulting function 3 months later is shown in *c* and *d*.



a *b* *d* *e*

Virginia City, Nevada
Dec. 31, 1922.

Dear Dr.

Just a few lines to let you know I am getting along fine as fare I am getting more movement in my fingers than I had. My thumb and first finger are about as good as they ever were, but the other two are stiff yet but more so than they did. The only trouble I have is with the cold. My hand gets like a piece of ice and turns purple, but that is from poor circulation I suppose. Outside of that every thing is O.K.

We have lots of snow up here and plenty of wind. Day before yesterday it blew the roofs off of two houses and tore all the power lines down.

I suppose you are having nice weather on the City now. I wish we

c

Fig. 16. W. J., age 29. Nine months previously he touched with his little finger a high powered wire and was rendered unconscious. Great necrosis and infection followed in the hand and forearm; pus was discharged for 8 months. All of the flexor tendons in the hand sloughed out with the exception of the flexor pollicis longus and this became densely adherent. So much ankylosis resulted that the wrist could not be extended, the proximal finger joints were fixed in the overextended position and the distal finger joints had practically no motion. As the limit of extension is shown in *a* and of flexion in *b*, it is seen that the hand was useless.

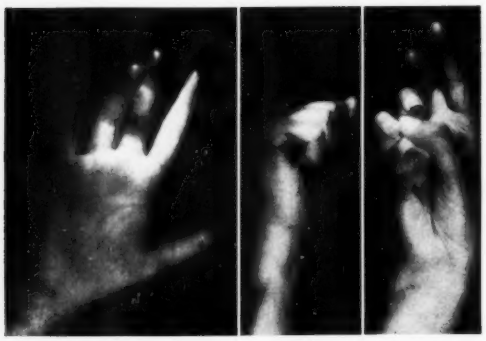
Treatment. The joints were first slowly drawn by mild and continuous traction into functionating positions, the wrist into extension by a cock-up splint and the proximal finger joints into flexion by the means shown in Figure 17, *D* and later in Figure 17, *E*.

Operation. The scar tissue was excised from within the palm and forearm; remnants of the flexor tendons were removed; that of the thumb was freed from adhesions. Four free tendon grafts from the long extensor tendons of the toes were used to act as flexor profundus tendons for each finger, as shown in diagram *c*. A very useful degree of function returned, as shown in *d* and *e*, 7 months later. He stated that he uses a pick and shovel, digs post holes, and works as fast as the other men. A sample of his writing with this hand is shown in *f*, 4 months after operation.

makes a longer line for the formation of adhesions to the tendons and in the finger cuts the pulleys and makes adhesions and roughness in just the line where the flexor tendon should glide most smoothly.

In the finger, lateral or cross incisions do less harm and in the palm L-shaped ones are preferable; incisions following the lines of the palm are the least deforming. Transverse incisions in the wrist and forearm and on the dorsal surface leave less disfiguring scars, as they fit into the natural lines of the wrinkles of the skin. Where an incision is apt to result in a contracture, as in crossing a flexion crease, it is well to zigzag it, so its later shrinkage will be spent in merely widening out the angles.

The greatest care should be observed to avoid injuring nerves, as much of the function of the hand depends on the trophic condition and on the sense of touch. The volar nerves in the fingers should be carefully spared. In the palm the nerves lie just beneath the palmar fascia. It is most important to spare the median motor branches to the



a *b* *c*

Fig. 18. H. L. A girl of 14 years thrust her right hand through a window severing just above the wrist both the ulnar and median nerves, the tendons of the flexor ulnaris and palmaris longus; also all of the flexor tendons, sublimus and profundus, of all fingers.

Operation. Twenty-four hours later the wound surface was excised and a primary repair was done on all of the severed tendons and nerves. *a* and *b* taken a year later show the power of flexion and extension obtained. Each finger can be flexed independently. Sensation commenced to return in the hand in 2 months and at the end of a year complete sensation returned including stereognosis. She could spread the fingers except at the third cleft, as shown in *a*. The action of the thenar muscles returned well, restoring opposition to the thumb, as shown in *c*.

thenar muscles, as they run transversely across the inner part of the thenar eminence; if cut, opposition of the thumb is lost. This often happens when incising for drainage in infection.

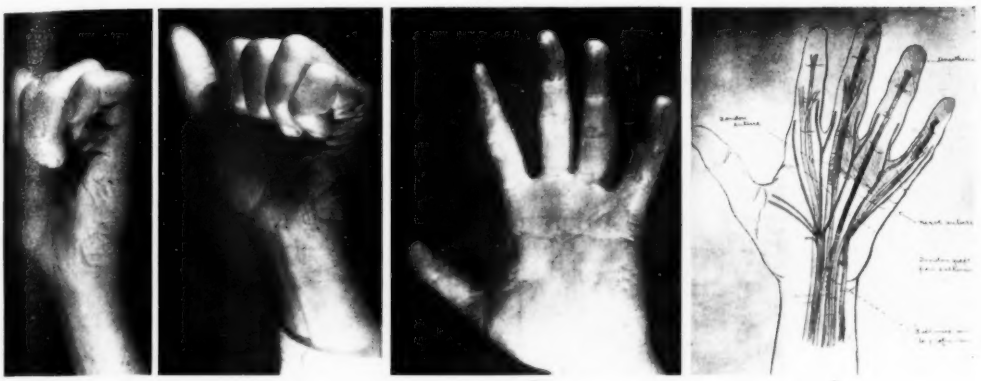
INJURIES TO NERVES

The nerves in the palm and the volar nerves of the fingers are as important as any other structure of the hand. Unless this is realized these tiny structures are often severed in incisions for drainage, or in dissections of the hand, resulting in loss of sensation and in trophic changes, which affect not only the skin but also the joints and all the deeper structures. One of the principal functions of the hand is that of sensation. If the nerves of a finger have been severed surgical repair of the tendon should be delayed until regeneration of the nerves has been accomplished after nerve suture. If this is not done the tissues will not heal well and if a tendon graft be put in, it will not only become adherent but it will degenerate, so that later it may break. It is perfectly possible to suture a nerve in the palm or finger. I have done it 54 times and in each instance with gratifying success. In one instance all of the eight nerves at the bases of the fingers were sutured and every one regenerated. Often the fingers must be slightly flexed to allow the nerve ends to be approximated, but they can be allowed to gradually straighten out after a month. Sensation to cotton and pin prick returns throughout the fingers in 5 months on the average. It may start to return in a month and extends in this short time the length of a finger segment. After a year even stereognosis may be present. This satisfactory regeneration is due to the fact that the nerves in the hand are not mixed ones and so sensory axones are not lost in growing down motor pathways and vice versa. Also, the more peripheral an injury is in the nervous system, the better is the repair. In those cases in which the nerve to the thenar muscles was sutured good function returned to these muscles and opposition of the thumb was restored. In some cases a free nerve graft from the sural nerve in the leg was used to bridge a gap in a nerve. In these cases a fair degree of sensation returned. No harm resulted from the loss of the sural nerve. In one case a 6 inch graft in the ulnar nerve restored sensation to the fingers (Fig. 20, *c*). In another case a similar graft in the median restored sensation to the fingers, which commenced to return in 2 months. Several other shorter grafts in the hand were also successful.

Nerve sutures above the wrist, though successful, are not always as completely so because here the ulnar and median nerves are mixed ones and some of the fibers may grow down the wrong channels. Thus, in median nerve sutures sometimes opposition of the thumb does not return if the one tiny motor bundle of nerve is not matched exactly opposite its distal continuation. In some of my cases it has, however, returned completely after suturing the main trunk of nerve (Fig. 18).

Severing the median nerve practically wrecks the hand, as objects can no more be felt by the special tactile surfaces of the thumb and first two and a half fingers, and because the thumb assumes a position at the side of the hand and can no longer oppose the fingers.

While a nerve is regenerating it is necessary to hold the muscles supplied by it in a state of



a *c* *d* *b*

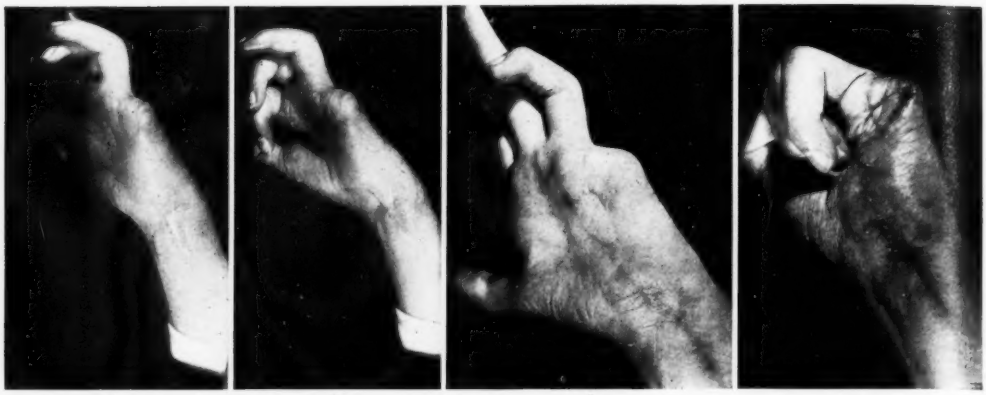
Fig. 19. H. R. Four months previously he fell, lacerating his palm with a broken bottle, severing the flexor sublimus of the long finger, both flexors of the ring finger, and the nerves to the third and fourth clefts. Infection followed with sloughing of some of the tendons of the ring finger. The tendon of the little finger became bound in scar tissue. The degree of flexion possible when coming for repair is shown in *a*. The hand is anæsthetic distal to the palmar scar and including the radial half of the little finger, all of the volar surface of the ring finger and the ulnar half of the long finger.

Operation. The structures of the palm were dissected free from scar tissue. The severed branches of the median and ulnar nerves were found to have a separation of one-half inch between their ends. The ends were trimmed off to good nerve fibers and by flexing the fingers were brought together and sutured with fine blood vessel silk perineurally. The ends of the sublimus tendon of the long finger which were separated an inch were sutured. There was a gap between the ends of the profundus tendon of the ring finger and its sublimus tendon had withdrawn up the forearm. One and a half inches of the sublimus tendon was used as a free graft to bridge the gap in the profundus tendon. See diagram *b*. In 3 months sensation returned to as far as the middle creases of the fingers and in 5 months over the complete area. At the sixth month there was some paræsthesia which was almost gone at the eighth month, at which time stereognostic sense commenced to return. Perfect function of the tendons returned as shown in *c* and *d*.

relaxation, otherwise their function will not return. To do this for the thenar muscles in cases of median palsy has been a problem. It can readily be done, however, if a strip of one-half inch adhesive plaster be looped about the outer side of the metacarpophalangeal joint of the thumb and made to draw the thumb into opposition (Fig. 17, *C*). The two ends of the adhesive are then brought around the ulnar side of the palm and wrist and applied to the back of the wrist and forearm for anchorage.

OPPOSITION OF THE THUMB

If opposition of the thumb cannot be obtained by nerve suture, or if the thenar muscles have been destroyed, function can be regained by a tendon transference operation. At first I tried using the sublimus tendon of the ring finger, bringing it through the palm to a new insertion on the outer side of the thumb. This resulted in merely adducting the thumb across, but did not make the thumb stand out forward from the palm for grasp. Next, I used the palmaris longus, with its prolongation of palmar fascia, and ran it subcutaneously to insert on the outer side of the distal end of the metacarpal of the thumb. This, combined with the former operation, gave a fairly good result. In later cases better results were obtained by leading either the tendon of the flexor sublimus of the ring finger, the flexor ulnaris, with a free graft extension, or the palmaris longus with its prolongation of palmar fascia, through a pulley in the vicinity of the pisiform bone and then subcutaneously directly to the distal end of the first metacarpal. The pulley was made by using a free tendon graft from an extensor tendon of a toe as a loop through the origin of the flexor minimi digiti. The pull on the thumb was then mechanically in the correct direction and the results were excellent (Fig. 22, *d* and *e*). In cases where the thumb has assumed a flexed position when opposed to the fingers from lack of power of extension, as in some cases of poliomyelitis, the tendon, which is to give op-



a *b* *d* *e*

c

Fig. 20. J. B. K. Eight months previously the wrist was lacerated on the ulnar side by a broken windshield, severing the ulnar nerve and the flexor tendons to the ring and little fingers. Such a severe infection followed that the little finger had to be amputated; the severed tendons and 6 inches of the ulnar nerve came away in the slough. The remainder of the flexor tendons became adherent in the palm and forearm. The wrist joint became fixed in flexion, the proximal finger joints became fixed in extension, and the distal finger joints had practically no motion. There was anæsthesia, as shown in diagram *c*. *a* and *b* show the limit of extension and flexion of the wrist and fingers.

Treatment. By mild and constant pressure the wrist joint was brought into the cock-up position and the proximal finger joints were put into flexion by methods shown in Figure 17, *D*, *E*, and *B*.

Operation. The cutaneous scars were excised and the scar tissue was dissected from within the hand and forearm. Tendons were freed from adhesions. The flexor tendons were removed entirely from the ring finger. A 9 inch free tendon graft was taken from the extensor of the second toe and sutured to the flexor muscles of the ring finger in the forearm, passed down through the palm and the ring finger and sutured to the distal phalanx, to act as the flexor tendon as in diagram *c*. A 6 inch length of the sural nerve from the same leg was used as a free graft to join the ulnar nerve in the forearm to the nerve to the last cleft in the palm. In 3 months heavy touch and pain could be felt in the patches over the whole anæsthetic area and touch in its proximal part. In 5 months cotton touch could be felt throughout the area. In 10 months he was able to identify gauze, cotton swab, and the metal of a key or coin, when touched to the ulnar side of the ring finger. Paræsthesia had disappeared. The degree of motion gained in 10 months is shown in *d* and *e*.

position to the thumb, can be attached to the tendon of the extensor longus pollicis at the metacarpophalangeal joint. The thumb will then properly oppose the fingers.

If no tendons are available the thumb can be placed in the position of opposition and held there by an ankylosis between the carpus and the metacarpus. This is but a last resort, however, as motion is restricted and there is danger of fracture if the hand is caught between two objects.

A better method where no tendons are available is to make a permanent check-rein by a free graft of fascia from the distal end of the first metacarpal to the pisiform bone. This will hold the thumb in opposition.

OTHER CONDITIONS

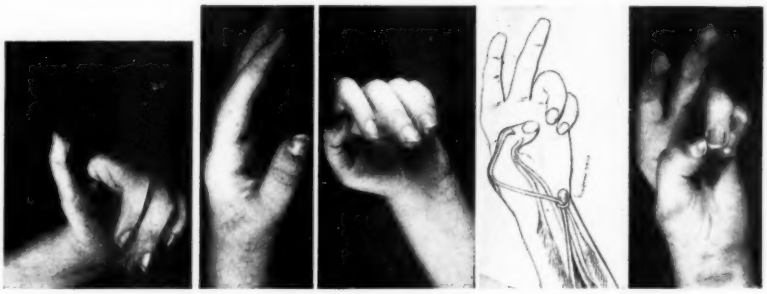
Cases of finger, thumb, and wrist-drop from musculospiral palsy may readily be corrected by bringing some of the flexor tendons around the forearm and attaching them to the extensor tendons. For this purpose the flexor ulnaris can be used to extend the fingers, the pronator teres to extend the wrist, the flexor carpi radialis to extend the wrist or thumb and the flexor sublimus of the ring finger to extend the thumb.

If the distal radio-ulnar joint is injured, so that supination is prevented, a small segment can be removed from the lower end of the ulna and thus make possible a complete degree of supination.

a *b* *c*

Fig. 21. C. T. H. Showing the crossing of fingers in flexion due to an amputation of the long finger proximal to its metacarpal head. The adjoining metacarpals not having the support of the intervening head rotate toward each other palmward, exaggerating the transverse metacarpal arch and tilting the axis of the joints toward each other. Showing also limitation of flexion of the fingers due to the fixation of the flexor tendons of the amputated finger to the stump. As the flexor tendons arise from practically a common muscle, the fixation of one tendon limits the excursion of the rest of the tendons.

Operation. By severing the flexor tendons of the long finger in the palm, and by removing the whole of the third metacarpal, normal function resulted, as shown in *b* and *c*.



a *b* *c* *d* *e*

Fig. 22. M. V., age 20. Infantile paralysis at the age of 4 left her with paralysis of the extensors of the fingers and of the thenar muscles. She had no power of extending the fingers as shown in *a*, and no ability to oppose the thumb against the fingers, *c* and *a*. Flexion of the thumb was very weak.

Operation. The tendon of the extensor carpi radialis brevis was transferred to pull on the tendons of the extensor communis digitorum, thus restoring the power of extension of the fingers, as shown in *b*. The tendon of the flexor sublimus digitorum of the ring finger was transferred in its insertion to the tendon of the flexor longus pollicis, thus giving strength to the motion of flexion of the thumb. The tendon of the palmaris longus, together with its extension, the palmar fascia, was passed through a pulley at the pisiform bone, made by a free tendon graft from an extensor tendon of the toe, and passed on subcutaneously and inserted into the tendon of the extensor longus pollicis. Good power of opposition was obtained, as shown in *e*.

If there be poor tissue on the end of a finger stump it can be excised and good skin can be put in its place by a pedicle skin-graft from over the pectoral muscle.

After an amputation, or injury of one finger, it is occasionally seen that the rest of the fingers can be passively but not voluntarily completely flexed, because the flexor tendon to the injured finger is fastened there and cannot be pulled. As the rest of the flexor tendons spring from practically a common muscle, the holding of one tendon holds to some extent the rest of them. By severing the one tendon full flexion is restored to the other fingers.

When a long or ring finger is amputated proximal to the head of the metacarpal, it will be found that the adjoining fingers will extend normally, but that when they flex they will cross far over each other. This is because the mutual support of the heads of the metacarpals is missing, thus allowing the adjoining metacarpals to rotate toward each other in their palmar aspect, resulting in a tilt of the axes of the proximal finger joints. The remedy is to resect the remaining portion of that metacarpal (Fig. 21).

The amount of work one can accomplish in a hand in one operation is limited by the time it is safe to maintain ischæmia. Dissection of the hand is so dangerous and difficult when the blood is flowing that all of that part of the work including nerve suture, repair of pulleys, tendon sheaths, and tendons is best completed before the tourniquet is released. As the time necessary to accomplish this, in cases where several tendon grafts and nerve sutures are to be done, is surprisingly long it is compulsory to work rapidly. Even then several operations may be necessary to repair a badly damaged hand.

The question will arise as to how much a hand may be injured to be beyond repair. If the finger joints are ankylosed, until we can make new joints, it is best to remove the finger as it will stand out in the way in work. (Two recent arthroplasties of proximal finger joints were very satisfactory.)

If there be an annular scar about a finger interrupting the nerve and blood supply the part distal to the scar had best not be operated upon, as partial necrosis will result.

If the nerves of a hand are damaged beyond repair not much can be expected in reconstruction.

A hand may be too much damaged by infection for its tissues to be fit for repair. When a severe storm of infection has passed through a hand the resulting tissues are hard and shrunken from the contracting scar formation, the joints are stiffened, and the tendons are adherent. The infection has followed the paths of nerves and blood vessels and the resulting scar contraction has so strangled them that the tissues supplied have become atrophic and congealed. The greatest damage is done in the closed spaces, as under annular ligaments, in the tendon sheaths and in the fascial spaces, where swelling is limited and necrosis, from both ischæmia and infection, results. Such a hand, in which the nerve and blood supply is no longer sufficient and in which the tissues are congealed, may be unfit for repair.

NOTE—For the repair and the grafting of new tendons in the hand, which has purposely been omitted in this article, the reader is referred to Surg., Gynec. & Obst., 1918, Jan., and 1922, July.

UNDESCENDED TESTICLE

Operative Treatment and End-Results

By CHARLES G. MIXTER, M.D., F.A.C.S., Boston
From the Surgical Service of the Children's Hospital

THERE are several points that are still unsettled in dealing with the improperly descended testis: the most advantageous age at which to attempt to place the testis in its proper site, the immediate operative result to be expected from surgical interference, and the development and function of the testis after its replacement. My experience with this condition has been chiefly in children and in reporting this series of 207 instances of undescended testis, I have included no case over 12 years of age. Of these, 106 were operated on by my associates at the Children's Hospital, and the remaining 101 were operated on by myself and comprise all cases treated at the hospital during the last 15 years, with the addition of cases of children from my own records. It has seemed better to consider children only in this discussion, so that it may serve as a basis of comparison with results obtained in other series, chiefly composed of cases operated on after puberty.

During the last 10 years 1,782 cases of inguinal hernia have been operated on, and of these 7.1 per cent had an accompanying maldescent of the testis. This percentage very closely coincides with Coley's statistics at the Hospital for Ruptured and Crippled. Bilateral ectopia occurred in the proportion of 1 to 3.2 of the unilateral variety.

During the later months of fetal life an evagination of the peritoneum, the processus vaginalis, extends into the inguinal canal, and this is followed normally by the descent of the testis into the scrotum in the seventh to eighth month. Very frequently the descent is delayed and it has been established by Wrisberg that as high as 30 per cent of newborn children have undescended testes. In the majority of these, the migration of the organ is completed in the first few weeks after birth. The gubernaculum testis, a muscular structure during fetal life which atrophies after the descent of the testis, is attached to the epididymis while it lies within the abdomen and extends down the inguinal canal. After emerging from the external inguinal ring the majority of its fibers continue down into the scrotum, while other bundles pass inward and upward on to the abdominal wall, others dip deeply downward into the perineum and still others spread out on the anterior surface of the thigh. It is along one of these latter paths that the aberrant or ectopic testis must descend.

On completion of the descent of the testis, fusion of the surfaces of the processus vaginalis takes place throughout its extent, except at the lower end where the tunica vaginalis is formed. As descent of the testicle must take place before fusion of the surfaces of the processus vaginalis can occur in the process of development, a congenital hernial sac is always found accompanying a true undescended testicle. On the other hand, with an ectopic testis of either of the three varieties, superficial abdominal, perineal or femoral, a congenital hernia need not necessarily be present.

A position of the testicle not infrequently seen, is one in which the testis is at the external ring and by traction can be brought down to the entrance of the scrotum. The scrotum does not have the typical shrunken appearance. At operation no hernial sac is found and an open pouch is present in the scrotum, instead of the entrance being completely blocked by firm adhesions that require considerable force to separate. This I believe is not a true undescended testicle, but one in which the cord is short. Probably it is this type that has been reported as descending into the scrotum spontaneously, and if on examination, it can be identified as such, operation should be deferred until after puberty in the absence of symptoms. It is difficult to believe that a true undescended testis accompanied by a congenital hernia can descend behind the sac to which its anterior surface is firmly adherent or

drag the abdominal peritoneum through the internal ring and inguinal canal, and force its way in to the scrotum through an entrance blocked by dense adhesions.

Many theories have been advanced to explain the arrest of the descent of the testicle. The two having the most evidence to support them are: first, the theory of a fetal peritonitis advanced by Cloquet and Wrisberg and strongly advocated by Beudinger; and second, the theory of heredity, brought forward by Godard and supported by Uffreduzzi. Beudinger maintains that cicatricial evidence will almost invariably be found at operation. My own experience has been that puckered cicatrices can be demonstrated within the hernial sac overlying the cord near the internal ring in a number of instances, but I have seen the same scars in congenital herniæ unaccompanied by cryptorchidism. Coley states that he has found no evidence in support of a fetal peritonitis in his large series of cases and with Uffreduzzi believes that heredity is the underlying factor. Certainly the familial tendency to this defect is marked and the condition is similar to that found in certain animals where descent of the testis does not take place, and it has therefore been interpreted to represent a sign of arrested development.

Uffreduzzi emphasizes the frequent presence of other stigmata of degeneration. We have found these very frequently present with bilateral cryptorchidism, but with unilateral defects other evidence of mental or physical retardation of development has rarely been noted.

The pathology of the undescended testis is a diminution in number and degeneration of the cells of the tubules, and a thickening of the basement membrane and tunica albuginea. The interstitial cells are increased. It is the internal secretion from these cells that establishes the secondary male characteristics. It is stated by Caulk that they also may degenerate later on and the testicle be replaced by an atrophic nodule of fibrous tissue. Double cryptorchids rarely have the power of procreation and when present it is generally short lived, the duration of fertility being usually less than a decade after puberty. Occasional instances have been reported of long continued fertility, but spermatogenesis is unusual, probably in less than 10 per cent of the bilateral cases.

Spontaneous atrophy of the testicle is more frequently encountered after puberty than in childhood. It is said that figures can be juggled to show any required result. Nevertheless it is interesting to note from the operative records that in this series of 168 cases, atrophy of greater or less degree was noted at operation in 10 per cent of the 90 boys between 6 and 12 years and in 6.3 per cent of the 63 children less than 6 years of age. In no case was atrophy noted in a child under 4 years.

Interference with the circulation in childhood will produce atrophy. Some 8 years ago in reporting a series of cases of undescended testis in childhood, I found that where the spermatic vessels were divided, atrophy practically invariably occurs. Acute obstruction of the circulation is frequent in adults with undescended testicle, about half the reported instances occurring in this type of case. As arrested descent of the testis occurs in the proportion of one to 500 normally placed testes, the proponderance of circulatory accidents occurring in the undescended testicle is very apparent. At the Children's Hospital we have had two emergencies of this type, one in a child of 8 months requiring orchidectomy and another in a child of 1½ years in which the testicle was saved. Coley states in his conclusions: "The atrophy usually found in the undescended or maldescended testis is not the result of the malposition. The change in structure and the atrophy are merely coincident, being due to congenital causes." In view of the fact that interference with the spermatic circulation will produce atrophy; that extremely rarely, at least, is spontaneous atrophy observed in very young children; that the percentage of such atrophy increases toward puberty; and finally, that, due to its malposition the undescended testis is more prone to acute circulatory accidents, it would seem that atrophy of the organ may be largely a result of interference with circulation occasioned by the malposition.

The undescended testis appears more prone to undergo malignant degeneration than that in which normal descent has occurred. Hin-

man stresses the susceptibility of the ectopic testis to malignancy and emphasizes the difficulty of diagnosis particularly in the abdominal variety. He emphasizes the necessity of orchidopexy or orchidectomy at or before puberty to obviate this danger. Cunningham collected 452 cases of malignant disease of the testicle, 40 occurring in ectopic testes, showing that new-growths occur over 10 times as frequently in normally descended as in imperfectly descended testes. On the other hand if we remember that normal descent of the testicle occurs 500 times to 1 maldescent the great susceptibility of the abnormally placed organ is at once apparent. Malignancy occurs most frequently during the period of greatest sexual activity. To avert the possibility of malignant degeneration it would appear wise to attempt the replacement of the organ before the physiological changes incident to puberty begin. Coley and Cunningham each report one instance of malignancy developing in a testis following the operation for undescended testicle, which in each instance had been performed by another surgeon. In Coley's case the new-growth was present or developed shortly after the primary operation, while in Cunningham's case it appeared after an interval of 5 years.

New-growths of the testis are relatively rare in childhood, three cases having been encountered at the Children's Hospital during the last 10 years among 9,579 admissions to the Surgical Service for all causes. In one child, apparently presenting an abdominal ectopia, as no testicle could be palpated in the scrotum or inguinal canal on the affected side, a large inoperable malignant growth was present in the lower abdomen. No necropsy could be obtained, but presumably this was a new-growth developing in the retained testis.

Previous to 25 years ago the majority of patients presenting undescended testicles were advised against operation, because of the poor results obtained. In 1898 Bevan described the operation that has since been followed by satisfactory results in large series of cases. As the operative results in the main are satisfactory, operation should be advised for various reasons. The mental balance of the patient with a malposition of the testical is often depressed and is relieved by replacement of the organ. The accompanying hernia is frequently troublesome and dangerous, and cannot be held in comfort by a truss. Where a truss is worn, serious damage to the testicle usually ensues. The danger from circulatory accidents and the susceptibility of the retained testis to new-growth should be removed. By operation the normal anatomical conditions are restored and by this restoration, it is possible that the spermatogenetic function of the testis may be retained.

That the principles of the operation as described by Bevan are not rightly understood or closely followed by many surgeons is attested by the number of poor results that are seen. Personally, I have re-operated upon three cases within the year in which retraction had followed the previous orchidopexy, but in which the testis did not show atrophy. In all three instances the testis is now well down in the scrotum and is normal to palpation.

Operative failures can be divided into three classes: atrophy ensuing after operation at which a testis normal in size and consistency was found; retraction unaccompanied by atrophy; and atrophy and retraction occurring together. Retraction is caused by insufficient lengthening of the cord and by the testicle being replaced in the scrotum under tension. The cause of postoperative atrophy is interference with the spermatic circulation. Bevan states that if sufficient length cannot be obtained by removing the fascial coverings of the cord and dividing the fibrous bands, the spermatic vessels may be divided, as the accompanying vessels of the vas which anastomose with the spermatic vessels will provide sufficient nourishment for the testicle. As the spermatic vessels are almost invariably the short elements of the cord, the greater length of the vas will premit the testicle to lie readily within the scrotum. This procedure, he states, is only required in about 10 per cent of the cases. Depending on this accessory circulation many surgeons use too little care in preserving the spermatic circulation and it is often sacrificed unnecessarily. Although gangrene of the testicle rarely ensues in childhood, atrophy of the testis almost invariably follows within a few months.

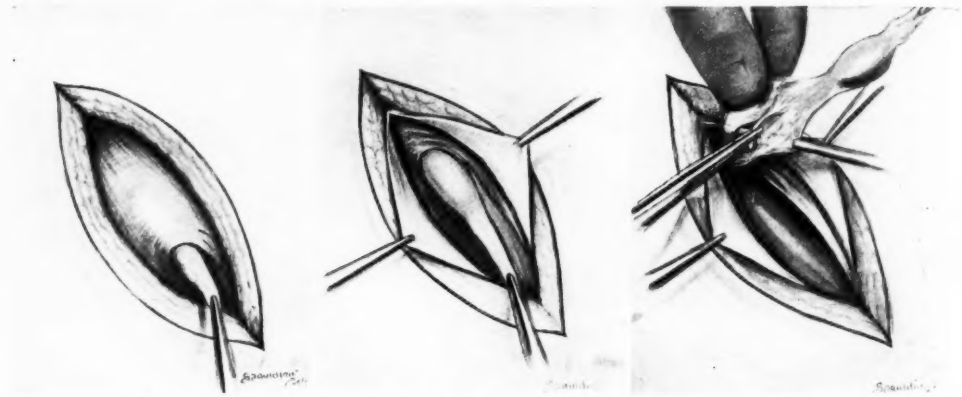


Fig. 1. Fig. 2. Fig. 3.

Fig. 1. The usual oblique hernia incision is made.
Fig. 2. The aponeurosis is split, the gubernaculum is freed and a pouch formed in the scrotum.

Fig. 3. The hernial sac is carefully separated from the cord, high up, the utmost care being taken not to injure the spermatic vessels.

In view of the poor results that are frequently obtained by inattention to the details of this well devised operation, it may not be amiss to describe the technique that has been satisfactory in my hands and differs in no essential from the Bevan operation.

Operative procedure. An oblique incision is made over the inguinal canal. The aponeurosis of the external oblique is split from the external ring well beyond the internal ring. The fibrous remnant of the gubernaculum, continuing downward from the lower border of the hernial sac, is freed from its attachment in the scrotum and a hæmostat applied to facilitate traction on the cord without traumatism to the testicle. A pouch for the testicle is prepared in the scrotum by breaking up the adhesions with the finger. The cremaster is divided and the sac opened high up near the internal ring, exposing the testicle which lies seemingly within the congential hernial sac. Separation of the sac from the cord should be done with the utmost care, as the vessels are spread out on the posterior surface of the sac as a broad band and any considerable injury to the spermatic vessels in childhood is almost invariably followed by a greater or less degree of atrophy. The sac is cut across and ligated high up. The cremaster and fibrous coverings of the cord are completely removed. A tunica is formed from the lower end of the sac by a purse-string suture of plain catgut. Care is exercised never to handle the denuded testicle, to obviate so far as possible the postoperative swelling.

The internal ring is then dilated by the finger passed inward behind the peritoneum. The vas will be seen leaving the vessels and passing downward and inward over the pulley-like margin of the transversalis fascia, the vessels continuing upward and inward. Generally little difficulty is experienced in obtaining sufficient length to the vas, and at times it may even form a long loop far down into the scrotum below the testis. To ensure relaxation of the vas and improve the exposure for further dissection, the transversalis fascia is split downward from the internal ring to the deep epigastric artery. Division of the deep epigastric vessels or transposition of the testicle and cord behind them yields in my experience only an insignificant increase in length of the cord as the only structure to benefit by this maneuver is the vas, with which there is rarely any difficulty.

A narrow retractor is introduced behind the peritoneum beneath the upper margin of the internal ring and by finger dissection the peritoneum is lifted up from the posterior abdominal wall. Then by traction on the hæmostat grasping the gubernaculum, fine fibrous bands anchoring the spermatic vessels to the

Fig. 4. Fig. 5. Fig. 6.

Fig. 4. The sac is cut across and a tunica formed from the lower end of the sac.

Fig. 5. The spermatic vessels are seen running upward and inward and the vas hooking over the upper margin of the transversalis fascia and running downward and inward.

Fig. 6. The internal ring is stretched and by finger dissection the peritoneum is freed from the posterior abdominal wall. When the peritoneum is raised upward fibrous bands holding the spermatic vessels appear and are cut or torn across.

posterior abdominal wall are defined and cut or torn across. These bands lie chiefly to the outer side of the vessels. When the cord is sufficiently lengthened to permit the testis to lie without undue tension in the scrotum, an unknotted temporary suture is taken through the gubernaculum and both ends are passed out through the scrotum and clamped to the operating sheet under tension, care being taken not to produce a torsion of the cord when the testicle is drawn down. The entrance to the scrotum below the spine of the pubis is closed over the cord with a purse-string suture. The abdominal wall is then repaired in the routine manner for closure of an inguinal hernia without transplantation of the cord. The external ring should be closed snugly around the cord, there being very slight danger of atrophy of the testicle from too tight a closure.

To arrive at a satisfactory result in the operation for undescended testicle, the greatest care and patience must be exercised. The spermatic vessels are delicate and readily torn. Atrophy is apt to follow a moderate degree of interference with the spermatic circulation. No one step in the operation will give the requisite length to the cord, but the sum total of the small gains accomplished by each step must be sufficient to allow the testicle to lie in the scrotum without undue tension. Otherwise the testis will be found to have retraced to the external ring within a few weeks.

The results obtained in this series of cases is best shown by the accompanying tables. Unfortunately only 84 cases have been traced and none of these histories shed any light on the question of the ultimate fate of the testicle showing whether operation before puberty may aid in restoring the spermatogenetic function. The testicle after replacement in the scrotum without interference with the spermatic circulation will apparently undergo the normal physiological changes at puberty. The size and consistency are normal as is also the pain sensation on pressure, but the proof of the development of spermatogenesis requires a large number of bilateral cases operated on in boyhood who demonstrate their fertility or in whom active spermatozoa in normal numbers are found after puberty. A sufficient number of such individuals must be reported to more than equal the 10 per cent instance of frequency of fertility in the unoperated cases. For this reason bilateral cases should be followed and the late results reported where possible.

A result has been considered satisfactory where the testicle has remained in the scrotum following operation and atrophy has not ensued. Very slight variations in size from the unoperated normal testicle have not been called atrophy. Where however, the testis has diminished to three-fourths the normal size or less, or has lost the normal firm consistency, it is classed as atrophic. Where the testicle is

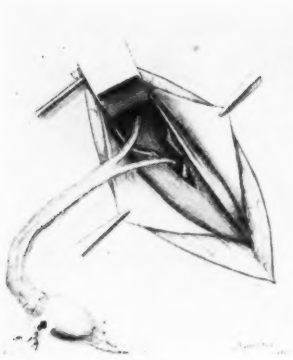


Fig. 7.

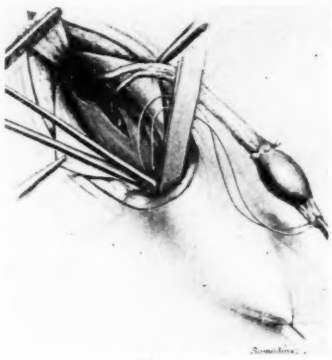


Fig. 8.

Fig. 10.

Fig. 7. The transversalis fascia is split downward to the deep epigastric artery.

Fig. 8. A temporary suture is placed through the remnant of the gubernaculum or lower end of the sac and passed out through the bottom of the scrotum and clamped under tension to the operating sheet.

Fig. 10. Closure in usual manner for radical cure of inguinal hernia without transplantation of the cord.

found to be atrophied at the time of operation and no improvement is noted, even though the organ remains in the scrotum, the result is classed as unsatisfactory. These cases have slightly raised the percentage of unsatisfactory results perhaps unfairly.

An unsatisfactory result from subsequent atrophy may be caused by the accidental tearing of some of the spermatic vessels at operation from unnecessarily rough handling, by including a portion of the vessels within the suture when the attempt is made to anchor the cord to Poupart's ligament, or when the spermatic circulation is tied and sectioned unjustifiably from lack of patience. In a certain number of cases, particularly in the intra-abdominal variety, it is necessary to deliberately cut the vessels to permit the testis to be placed in the scrotum. Although atrophy and aspermatogenesis will almost certainly ensue, it is better to have a testicle of this character in the scrotum than in the groin or abdomen where strangulation or the development of a new-growth may occur.

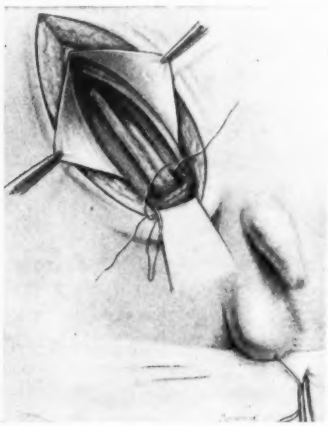


Fig. 9. A purse-string suture closes securely the entrance to the scrotum over the vas and vessels.

An unsatisfactory result from retraction invariably means that there was undue tension on the cord after reposition of the testicle. Either the vessels had not been sufficiently freed retroperitoneally, or the vessels themselves were so short that they should have been tied and cut. Rarely the vas seems to be the cause of difficulty. In such a condition I use a modification of Davison's technique, in which he cuts the deep epigastric. The transversalis fascia is split downward to the pubic spine and the deep epigastric is mobilized and the testis and cord drawn downward beneath it. This definitely lengthens the vas.

Retraction, when it occurs, frequently becomes evident before the patient leaves the hospital in from 2 to 3 weeks. Atrophy is definitely noticeable in from 3 to 6 months in the majority of cases.

The operation for undescended testicle may be performed at any age with a good prospect

for a satisfactory result should the indication arise. The best time is between the ages of 5 and 12 years. In very early childhood the structures are so delicate that vessel injury followed by atrophy is difficult to avoid.

Regarding the position of the testicle at the time of operation, the lower the testis has progressed in its descent, the better the outlook for a good result.

As Coley pointed out, the occurrence of the superficial abdominal type of ectopia is far more common than was formerly believed. In the accompanying tables the four cases mentioned under the heading of ectopia are undoubtedly incorrectly classified because this type of maldescent was not recognized at operation. In general one may expect a satisfactory result in 75 to 80 per cent of the cases coming to operation. These figures are derived from the outcome of operations performed during the last 8 years, as previous to that time the importance of preserving the circulation to the testicle intact was not fully realized. The 78 per cent of good results obtained over this period very closely correspond to my own series of 101 operations over a period of 15 years, during which time every effort was made not to impair the spermatic circulation. Of 61 operative results examined, 79 per cent showed a good result. In the intra-abdominal variety, only about 50 per cent will prove satisfactory because of the frequent necessity of depriving the growing testicle of its main blood supply.

An interesting fact brought out by a review of this series of cases has been that in 7 instances where the testicle was deemed slightly atrophic by the surgeon at the time of operation, a subsequent examination of the testicle after a lapse of months or years has revealed an organ apparently normal to palpation. If this observation is substantiated, it would be an added argument of considerable weight for early operative interference.

Though the operation for undescended testicle is a fairly long procedure to which to subject a child, and should be carefully and painstakingly performed to assure a good result, it is accompanied by very little shock. In practically all bilateral cases I believe both sides can be safely operated on during the one anæsthesia. One fatality mars this series. A baby of 16 months with a large troublesome hernia accompanying a unilateral ectopia did well for 10 days following operation, then developed anuria and died in 36 hours. This gives us an operative mortality of 0.5 per cent. In no instance has a recurrence of the hernia been noted.

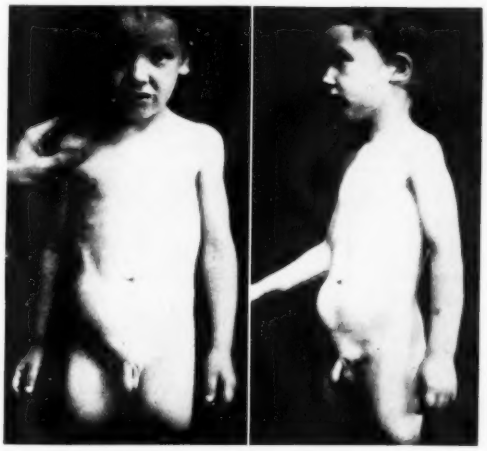


Fig. 11. Example of superficial abdominal ectopia with a very large congenital hernia.

TABLE I.—PRE-OPERATIVE DATA

	Number of cases
Cases operated upon	168
Total testes operated upon	207
Involving right side	75
Involving left side	54
Bilateral cases	39
Position of Testis at Time of Operation	
Intra-abdominal	24
Inguinal canal	119
External ring	56
Ectopic	4
Unclassified	4
Stated as atrophied at operation	15
Age at Operation	
Before 4 years	33
4 to 8 years	64
8 to 12 years	71

TABLE II.—END-RESULT DATA

Total number cases reporting for examination	87
Total number of operative end-results examined	107

Age at Operation	Result Satisfactory	Result Unsatisfactory
Before 4 yrs	9	6
4 to 8 yrs	32	10
8 to 12 yrs	32	18
Total	73	34
Percentage	68	32

TABLE III.—RESULTS DEPENDING ON POSITION OF TESTICLE AT TIME OF OPERATION

Position of Testicle	Unsatisfactory Atrophy	Unsatisfactory Retraction	Satisfactory High in Scrotum	Satisfactory Low in Scrotum	Per cent
Intra-abdominal..	5	..	4	3	58
Inguinal canal....	17	5	18	32	69
External ring	3	4	4	11	72

In one instance testicle was replaced in abdomen at operation.

Atrophy following interference with spermatic circulation

	No Atrophy	Atrophy	Per cent
Vessels all cut.....	2	13	84
Partially cut.....	2	5	..
None cut.....	68	9	12

No entry made in 8 cases in which the testicle was noted as markedly atrophic and no change has resulted following operation.

TABLE IV.—RESULTS IN PATIENTS TRACED

Time Elapsed Since Operation	Results Satisfactory	Results Unsatisfactory
2 mos. to 1 yr.....	15	2
1 to 2 yrs.....	11	7
2 to 5 yrs.....	22	6
5 to 10 yrs.....	22	16
Over 10 yrs.....	3	3

END—RESULTS OF OPERATIONS SINCE 1914

Position of Testicle at Operation	Result Satisfactory	Result Unsatisfactory
Intra-abdominal.....	6	3
Inguinal canal.....	38	7
External ring.....	8	5
Total.....	52	15
Percentage.....	78	..

SUMMARY

Operations for undescended testicle in childhood may be expected to yield 75 to 80 per cent of satisfactory results; that is to say, the testicle remains in the scrotum and subsequent atrophy does not ensue.

To attain this result,the spermatic circulation should be preserved and the cord lengthened sufficiently to allow the testicle to be placed in the scrotum without tension.

In a certain number of cases in particular those of the intra-abdominal variety, it will be necessary to section the spermatic vessels. Where this procedure is unavoidable, atrophy occurs in 85 per cent of the testes. It is indicated in only about 10 per cent of all cases.

Atrophy may ensue where the spermatic vessels are not divided. This is probably due to accidental tearing of some of the trunks at operation or inclusion in the stitches, if the cord is anchored to Poupart's ligament.

Operation may be undertaken at any age with the expectation of a good result, if the accompanying hernia becomes troublesome or other indications arise.

The preferable age for operation is between 5 and 12 years. At an earlier age the structures are so delicate that injury to the spermatic vessels is difficult to avoid.

Orchidectomy should not be done in childhood. Replacement of the testes in the abdomen should also be avoided on account of the risk of a future malignancy. In even the most difficult case, section of the spermatic vessels and transposition of the vas and its accompanying vessels behind the deep epigastric will make it possible to place the testis in the scrotum.

The examination of the cases that have been operated on in childhood with preservation of the spermatic circulation and have passed the age of puberty, frequently reveal on palpation a testicle that has apparently developed normally.

From this series no light has been thrown on the spermatogenetic function of the undescended testis subsequent to an operation performed before puberty. It is hoped that later the bilateral cases of this type may afford some valuable data.

In no instance has a recurrence of the hernia been observed.

CARCINOMA OF THE STOMACH IN YOUNG PEOPLE[1]

By RAYMOND P. SULLIVAN, M.D., F.A.C.S., New York

THE following discussion of carcinoma of the stomach in the young was suggested by a personal observation in a young man of 22 years, and is restricted to the occurrence of the disease in the first two and a half decades of life.

CASE REPORT

(No. 1249, 1922, St. Vincent's Hospital) John M., a student, age 22 years, was referred to the writer, March 22, 1922. The chief complaints were (a) epigastric pain of 4 months' duration, and (b) loss of flesh, strength, and weight.

Present illness. Up to 4 months ago he enjoyed good health when he began to complain of a dull epigastric pain coming from 1 to 2 hours after meals and lasting for indefinite periods. This pain was usually relieved by food ingestion or alkali. At first vomiting occurred shortly after eating, often before the onset of pain. The vomitus consisted of undigested food, but never any blood. There was considerable gas belching immediately after and between meals. Recently the pain had become more intense and prolonged, with radiation through to the back on several occasions. There was never any associated jaundice. The bowels were irregular and the appetite good, but the stomach distress appeared after a small amount of ingested food. Up to 2 weeks ago he slept well. Since then, he has been awakened often with pain and gas distress, relieved by alkali or vomiting. He has lost 10 pounds in the past 3 weeks, tires very easily, and has noticed his "pale" color increasing.

Past history. He has never had any infectious disease, injury, or previous operation.

Family history. His parents, brothers, and sisters are living and well.

Physical examination. The patient is a tall young man, quite pale, with rather worried expression; weight, 121 pounds; blood pressure, 130–80; temperature 99.4 degrees F., pulse 94, respiration 20; red blood cells, 3,400,000; white blood cells, 11,000; polymorphonuclears, 76 per cent; lymphocytes, 22 per cent; eosinophiles, 1.6 per cent; hæmoglobin, 56 per cent (Sahli); Wassermann, negative. The head, neck, and chest are well developed. The abdomen is scaphoid in shape. There is definite tenderness over the epigastrium, maximum along the mesial border of the upper right rectus muscle. An indefinite mass is palpable in the pyloric region. The extremities are normal with satisfactory reflexes. Two ounces of a test meal were recovered well digested; blood was present; free acid 36, total acid 56.

X-ray examination. Fluoroscopy, after a six-hour meal, showed the head of the bismuth column in the hepatic flexure, with some of the bismuth remaining in what proved to be the third portion of the duodenum. The full meal as is well illustrated on the films shows the stomach of the orthotonic type with a defect in the lesser curvature, a niche, over which no peristaltic waves passed, although many waves passed over the greater curvature. The entire duodenum appears to be filled and on deep palpation appears to be fixed.

Provisional diagnosis was made of penetrating ulcer on the posterior gastric wall, with adhesions to the pancreas; and adhesions with constrictions about the duodenum.

Operation was performed March 29, 1922, St. Vincent's Hospital, New York City, under gas ether anæsthesia.

Operative findings. The stomach was found considerably dilated, the posterior wall being fixed to the pancreas by an irregular mass occupying a portion of the pars pylorica and pars media. Transgastric exploration revealed this to be a large irregular ulcerative mass having a definite overhanging wiry edge quite suggestive of malignancy. At the center of the crater there is evidence of penetration toward the pancreas. Lymphatics along both curves were enlarged and soft. The duodenum was found bound down by a firm mat of vascular adhesions. The liver was moderately congested, but showed no evidence of metastases. The operative precedure consisted in a partial gastrectomy of a modified Billroth II type. The duodenal stump was inverted and held by three layers of purse-string sutures of chromic catgut. Anastomosis was made close to the cut end of the stomach with fixation of transverse mesocolon well above the gastric suture line.

PATHOLOGICAL REPORT BY FREDERIC SONDERN, M.D.

Macroscopic examination. The specimen consists of a portion of the stomach with a round tumor measuring about 85 millimeters, the margin of which is superelevated while the center is concave. The serous surface presents few small nodes, is hard in consistency, white in color, and covered with coagulated fibrin.

Microscopic examination. The sections show a scanty stroma supporting very few blood vessels and wide agglomerations of polymorphous cells, epithelial in character. These cells are unequal in size without intercellular substance and present large hyperchromatic nuclei. Many mitotic and pyknotic figures are seen. In places, there is a moderate infiltration of lymphoid elements. Necrotic areas, extravasated blood, and much nuclear débris are also found.

A diagnosis was made of carcinoma simplex of the stomach.

[1]Read before the Southern Surgical Society, White Sulphur Springs, December 11, 1923.

The postoperative course was very smooth, with no vomiting or wound infection. Liquids were given by mouth 40 hours after operation in small amounts, gradually increased. Soft diet was given on the sixth day, and a full meat-free diet on the fourteenth day. He was discharged from hospital April 25, 1922.

Follow-up. On May 1, 1922, he reported a gain of 7 pounds in 3 weeks, but complained of an occasional dizzy sensation. There was no stomach distress, the appetite was good, hæmoglobin 78 per cent.

June 13, 1922, he reported a gain of 20 pounds since operation, and no complaints. He was eating a general diet. He slept well and had gained in strength; hæmoglobin, 84 per cent (Sahli).

October 30, 1922, he reported a gain of 24 pounds in weight. He had had one or two attacks of stomach distress after meals, of 1 to 5 minutes' duration, always relieved by gas eructation. His weight was 145½ pounds. At this time a small thrombotic external hæmorrhoid was incised and a clot evacuated; otherwise he felt "great."

March 29, 1923, he reported weight 149½ pounds, and no complaints. The bowels were regular. He said, "I eat everything." His occupation was the same as before operation and he had plenty of "pep" and rested well. Examination of the abdomen failed to reveal any evidence of mass or tenderness.

November 16, 1923, he reported in person for X-ray study and physical examination. The weight was 154½ pounds; no complaints—"feel fine"; no evidence of recurrence was found.

The X-ray showed evidence of good function and motility; the position was good.

Gastric carcinoma is undoubtedly of exceptional occurrence before the age of 25 years, whereas from the thirtieth year on, its incidence rapidly increases. "No age is immune, and a diagnosis relying to any degree on the tenet of 'cancer age' may lead to a fatal issue" (Golob).

STATISTICAL DATA

Cancer of the stomach during the first decade is extremely rare. Only 6 cases below the age of 10 years were on record at the time of publication of Osler and McCrae's clinical study of the subject (1909) comprising an analysis of 7,000 cases. Four cases concerned infants under 6 weeks; 1 patient was a child of 18 months; one observation on a boy of 8 years concerned a duodenal rather than a gastric carcinoma. During the second decade, gastric cancer is likewise very rare, and only 13 of such cases could be compiled by Osler and McCrae. The youngest patient was a girl of 13 years with carcinoma of the cardiac end of the stomach. The other cases were 1 aged 14 years, 1 aged 15 years, 1 aged 16 years, 4 aged 17 years, 2 aged 19 years, and 3 aged 20 years. In the third decade, cancer of the stomach is more common and probably occurs to the extent of 3 to 4 per cent. Of the 6 cases collected by Osler and McCrae, the youngest patient was 22 years of age, like the young man under my own observation.

Of 50 gastro-intestinal cancers in youthful patients collected by Bernoulli in 1907, the stomach was the seat of the tumors in 13 cases, 5 of which concerned the pylorus. Three of these 13 cases are credited as originating from ulcer of the stomach.

HISTOLOGY

With respect to the microscopical forms of gastric cancer, a useful classification, adopted by a number of observers is the following: (1) adenocarcinoma, (2) solid carcinoma, and (3) mixed types. The two first groups are subdivided into (a) carcinoma simplex, in which the relative proportions of the cells and the stroma are, so to speak, normal, neither element preponderating; (b) medullary carcinoma; (c) scirrhus; and (d) carcinoma gelatinosum or colloid cancer.

It is difficult to make any statement as to the relative frequency of these forms, as specific designations of the variety found are missing in a number of reported cases. Mixed or transitional types are very common, and would probably be found with even greater frequency on examining the entire specimen instead of only a single portion of the tumor. Among 13 cases of cancer of the stomach in patients under 20 years of age, Bernoulli found 1 adenocarcinoma; 1 medullary solid carcinoma; 5 colloid cancers, derived from adenocarcinoma or solid cancer; 3 scirrhus cancers; 1 diffuse carcinoma; 1 mixed type; 1, no statement. Soft cancer is accordingly often seen as shown by 5 of 12 cases.

SYMPTOMATOLOGY

After a detailed study of several reported cases, the characteristic picture of juvenile gastric carcinoma is sudden onset; violent, rapid course, with persistent febrile temperatures; absence of cachexia; and early appear-

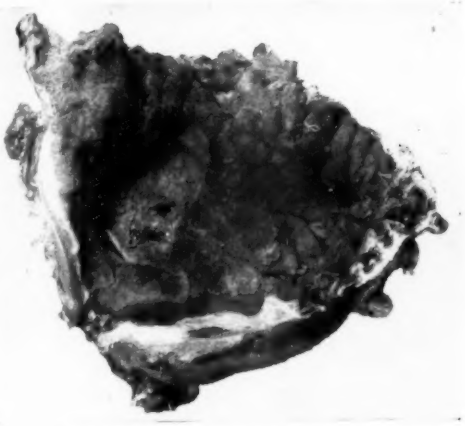


Fig. 1. Carcinoma simplex of the stomach.

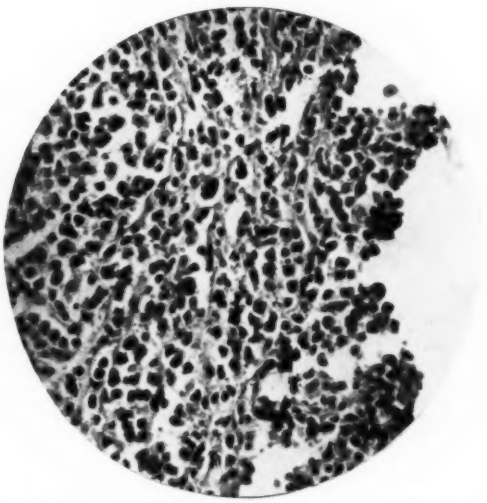


Fig. 2. Histological picture of carcinoma shown in Figure 1.

ance of metastases. The rendering of an early diagnosis is even more difficult here than in gastric cancer at a later age. Often the discovery of a palpable tumor in the gastric region first directs attention to the existence of a malignant neoplasm. The gastric chemistry and motility, demonstration of hæmorrhages in the gastric contents, general manifestations as well as symptoms in the part of the digestive apparatus, and radiographic findings show no difference in these cases as compared to the gastric cancer of older patients. There is also no demonstrable difference as to the histological type of juvenile carcinoma, or with respect to the seat of the growth in the stomach. There are only three features by which these juvenile cancers differ from those seen in older patients; absence of cachexia; early onset of high temperatures, and early formation of metastases. The absence of cachexia is explained by the rapidity of the course, so that the digestive disturbances lead surely to loss of weight, but not to aged wasting of the body. The high temperature is referable to disintegration and breaking down of carcinomatous tissue, the fever beginning at a relatively early stage and persisting until death. The early dissemination and rapid formation of nodules in a great variety of organs represent a remarkable feature of these cases. The nodules are sometimes seen to become rapidly scattered over the entire abdominal cavity. In a case reported by R. Schmidt, in 1916, of a medical student of 23 years, lymphogenous miliary carcinosis of the lungs was found with metastases in the bronchial, mediastinal, and retroperitoneal lymph glands.

In an article discussing the clinical differentiation, between gastric sarcoma and carcinoma, Schlesinger utilizes the violent course of juvenile gastric carcinoma for the differential diagnosis from gastric sarcoma; the presence of lymphosarcoma being rendered probable by a slow evolution of the disease in youthful patients as opposed to the rapidly progressive and metastasis-forming carcinoma. His observations include 3 cases of cancer of the stomach in patients under 20 years of age. In a girl of 14 years, only 2 weeks intervened between the initial symptoms and the fatal outcome; in a girl of 17 years the entire duration of the disease amounted to only 3 weeks; in a boy of 15 years, the disease likewise ran its course within a few weeks. In one of the young girls the disease began with thrombosis of the brachial veins, and a hard gland was palpable in the left supraclavicular fossa. As a typical umbilical metastasis was discovered on examination, carcinoma of the stomach was suspected in spite of the absence of a

palpable tumor or distinct gastric symptoms. Within a few days the presence of gastric cancer became demonstrable. It is noteworthy that Schlesinger knows of no cases in which operative interventions were not rendered hopeless from the start through early and profuse formation of metastases. He emphasizes on the basis of extended hospital experience, with ample opportunity for clinical and anatomical observation, that gastric cancer in youthful patients between 10 and 20 years of age is usually characterized by the extraordinary rapidity of its course. The behavior of the gastric chemistry and motility, occult or manifest hæmorrhages, blood findings, urinalysis, pain, size of tumor, and so forth, do not permit a satisfactory differentiation between carcinoma and sarcoma of the stomach.

The symptomatology of gastric cancer in the young as compared to that seen in older patients presents no essential differences, according to all observers, although genuine cachexia appears to be less common in these cases. Often there is merely anæmia, with an otherwise fairly good nutritional condition. The progressive anæmia, combined with constant pain, gave me my clue in an otherwise obscure case. The diagnosis is perhaps not always rendered, because in a general way, a malignant tumor is not so readily thought of in a youthful patient. Timely recognition and removal of the cancer are especially important, in view of the tendency to a remarkably rapid course, a prolonged duration being exceptional. Surgical interference, according to the literature, has usually proved inefficient, coming too late for radical removal of the primary growth and prevention of metastases. The future will have to show if the onset of malignant disease can be discovered by improved serological methods.

DIAGNOSIS

It is of great practical importance not to slight or omit a careful general examination in a young patient suffering from chronic gastric disturbances, under the erroneous impression that a malignant process is impossible at this early age. In view of the fact that a pathognomonic symptom of gastric cancer, other than fully developed tumor does not exist, it is urgently indicated that all available diagnostic adjuvants be utilized. Among the important diagnostic aids in these cases, other than X-ray study, is the proper use of gastric catheterization; for aside from the microscopical and chemical study thus available, it will help to ascertain the exact localization of a tumor when the stomach is empty. The omission of this method of examination may lead to serious error in diagnosis. In one of Ruetimeyer's cases, a girl of 19 years, who had been treated a long time with drugs for "dilatation of the stomach," it became possible after the removal of the enormous gastric contents from the fasting stomach, to recognize a distinct, hard, nodular, apparently freely movable tumor in the pyloric region, which could not be palpated before the irrigation on account of the tension of the abdominal coverings. The recognition of cancer is especially important in the so-called prediagnostic phase, and a searching inquiry must be instituted on the basis of the slightest suggestive evidence. And it must be kept in mind that there is a natural absence of distinct manifestations in the case of growths affecting neither the cardiac nor the pyloric orifice of the stomach, and therefore interfering at first in no way with the entrance of the food or its passage out of the organ.

TREATMENT

Operative treatment of gastric cancer in the young as well as in older patients is indicated in all cases in which the removal of the tumor itself and its immediate metastases seems to be possible, and also in those cases in which the neoplasm has led to stricture of the cardiac or pyloric orifice of the stomach. An exploratory operation is called for in most cases. Contra-indications against surgical interference in any form may be due to the general condition of the patient or to the behavior of the malignant tumor itself.

Non-operative methods under consideration are irradiation with X-ray or radium. But so far results are not encouraging and this procedure is applicable only as a last resort. Experience has shown that the results of raying are not improved by so-called externalization of the tumors followed by direct radiation.

Serum therapy is claimed to have occasionally exerted a beneficial action on the course of gastric carcinoma, but the results are neither uniform nor reliable. The purely medical treatment of these cases must of necessity be limited to the treatment of symptoms, especially pain and starvation.

Surgery of carcinoma of the stomach. Total or partial gastrectomy is always the procedure for consideration in these cases. Total gastrectomy will seldom be called for because of the low per cent of cases warranting it. Partial gastrectomy, when possible, is the procedure of choice. In the Billroth I or II, the Pólya-Balfour, or the Finsterer operations the essential requisites for adequate removal of the tumor and gland-bearing tissues will be found. Likewise, these operations provide a satisfactory reconstruction of the gastro-intestinal tract. The operation of gastro-enterostomy is indicated when radical surgery is no longer possible, or in existing or incipient pyloric stenosis in inoperable cases. Anterior gastro-enterostomy combined with jejuno-jejunostomy should be considered, especially if the growth shows a tendency to spread on the posterior wall. An exploratory laparotomy alone will be restricted to those inoperable conditions where gastro-enterostomy is not required. The performance of gastrostomy is called for in inoperable cancers situated at the cardiac orifice, while a jejunostomy may be done in cases of pyloric carcinoma with stricture, where gastro-enterostomy is not practicable for technical reasons.

CONCLUSIONS

1. Gastric carcinoma in young people should be considered more often.

2. The sudden onset, rapid course with persistent febrile temperature and progressive anæmia without cachexia in a young person complaining of gastric distress and pain should raise the suspicion of carcinoma.

3. Surgical treatment should be not only early, but as radical as possible.

CASE REPORTS

CASE 1. Reported by C. T. Cullingworth. This observation concerns the youngest known case of gastric carcinoma, in a newborn infant, who from the tenth day of life on suffered from vomiting and obstipation. Rapidly progressive cachexia supervened and led to death in the fifth week. The autopsy showed an enormously dilated stomach which occupied almost the entire abdominal cavity. The gastric wall was considerably thickened, especially at the pylorus, which presented a pear-shaped protruding ulcerated tumor, occluding the pylorus. Microscopical examination showed a cylinder cell epithelioma.

CASE 2. Reported by A. Scheffer. Carcinoma of the gastric fundus, in a boy of 14 years, gave the clinical picture of an extremely painful enlargement of the spleen, with irregular remittent fevers. In the last few weeks of life, coffee-ground like masses were vomited. The patient died 13 weeks after the beginning of the disease. The autopsy showed the gastric fundus to be constricted by the tumors; a large ulcer occupied almost the entire fundus, as far as the cardia. The tumor had penetrated through the gastric wall, involving the left kidney and the spleen, which was for the most part destroyed. The pancreas was entirely encased and infiltrated by the tumor. The greater curvature was occupied by tumor nodules. Metastases were found in the mesenteric and lumbar lymph glands. Microscopical examination showed a medullary carcinoma.

The case of primary gastric cancer was practically concealed during the patient's lifetime by the secondary cancer of the spleen. In the course of the disease, the spleen became involved and for the most part destroyed. In these circumstances, the symptoms on the part of the stomach may become so effectually obscured that no reliable diagnosis of gastric carcinoma can be rendered during life, the symptom complex on the part of the spleen dominating the entire clinical picture.

CASE 3. Reported by N. Moore. The patient was a girl of 13 years, who came under treatment with symptoms of extreme anæmia, heart failure, and œdema. The spleen was enlarged, but stomach symptoms were absent until two days before death, when the patient began to complain of vomiting and abdominal pains. The autopsy showed a cancer 8 centimeters in diameter, situated at the cardiac end of the stomach and adherent to the liver. Perforation into the abdominal cavity had occurred, giving rise to recent peritonitis. There were no metastases. Microscopical examination showed a soft medullary cancer. "The microscopic characters of the new-growth were those of carcinoma, with somewhat wide trabecular and extensive mucoid degeneration of the cells, with hæmorrhages into several parts of the growth." There were no other infiltrations.

CASE 4. Reported by H. Koester. This was a case of gastric carcinoma in a boy of 17 years. The clinical picture was characterized by emaciation, hæmatemesis, and a palpable tumor in the epigastrium. Detailed examination showed a dilated stomach and the absence of free hydrochloric acid. The autopsy revealed an ulcerated scirrhous cancer of the extremely narrowed pylorus. Numerous nodules were distributed over the peritoneum, but no other metastases.

CASE 5. Reported by Ashby and Wright. This observation concerned a child of 8 years, who at the time of admission to the hospital suffered from meteorism, without other symptoms. Some months later a tumor could be palpated to the right of the umbilicus. The patient complained of severe pain and died soon afterward. The autopsy showed solid adhesions between the stomach and duodenum and transverse colon. The stomach was dilated and hypertrophied, and the pylorus barely admitted a finger. At the pylorus, toward the stomach, were two small tumors the size of a pea; downward at the duodenal entrance, was an ulcer with irregular margins. Microscopical examination showed carcinoma.

CASE 6. Reported by R. Durzea. The patient, a young woman in her twenty-second year, had always been in good

health until the age of 21 years, and gave an excellent family history. Her illness came on gradually, with eructations and anorexia. Vomiting occurred first at intervals, then became daily, and finally recurred after every meal; it was painful and so frequent that practically all the patient's food was rejected. In addition, a colorless glairy mucus was expelled, but no bile or blood-stained material until very late in the disease. The treatment was general and symptomatic, but had no effect beyond temporary relief of the pain. The illness lasted barely eight months, and up to about the fifth month gave rise only to general disturbances such as emaciation, pallor, and loss of strength. There was no elevation of temperature. Abdominal palpation up to this time yielded only considerable dilatation of the stomach demonstrable by percussion. By exclusion, a probable diagnosis of tumor of the stomach was reached, in the absence of a positive local symptom. From the fifth month on, a positive diagnosis of gastric tumor and obstruction of the pylorus was rendered. The growth not only increased in size, but became ulcerated at its internal portion, eroding the vessels, for coffee-ground vomitus at this time made its appearance. Eight months after the onset of the disease the patient died under symptoms of progressive cachexia and anæmia. The autopsy showed a greatly dilated stomach containing a tumor the size of a very large orange without adhesions to the neighboring organs. The tumor was absolutely limited to the pylorus, and no metastases could be discovered in the other abdominal or thoracic viscera. Histological examination of the tumor showed a cylindrical cell epithelioma of the stomach.

CASE 7. Reported by E. Hirtz and E. Lesne. The patient was a young woman of 19 years, who had acquired syphilis in her thirteenth year. The gastric affliction had existed four months, with severe epigastric pains after meals, and occasional vomiting. She lost in weight, and symptoms of stenosis of the cardiac end of the stomach gradually supervened. The diagnosis was luetic stricture. Death was hastened by phthisis with cavities in both pulmonary apices. At the autopsy, the stomach was found to be adherent to its entire surroundings. The gastric wall was whitish and thickened as a whole, being 5 centimeters thick at the greater curvature. The pylorus was sharply bounded off from the duodenum. There was chronic peritonitis, with small nodules. The mesenteric glands were enlarged, with partly caseated centers. Macroscopically, the diagnosis of syphilis was rendered, but careful microscopical examination showed a diffusely infiltrating carcinoma, extending over the entire stomach derived from cylindrical cell cancer. There was carcinosis of the peritoneum. Microscopically, tumor cells were also found in the omentum, the mesenteric glands, the pancreas, and the spleen. The diagnosis of extensive epithelioma of the entire stomach in this youthful patient was rendered only on the basis of the microscopical findings. The condition during life had simulated a stricture of the œsophagus, and the macroscopical appearance did not present the ordinary feature of cancer of the stomach.

CASE 8. Reported by De la Camp. Two cases of gastric cancer in youthful individuals are reported. One observation concerned a boy of 16 years, who had suffered from gastric disturbances 4 weeks, with rapid emaciation and death. The autopsy showed a tumor of the pyloric region. Under the microscope the thick connective tissue with fairly numerous nuclei was found to contain more or less extensive layers of epithelial cells. The muscularis was invaded in part by connected proliferations, while the muscle fibres were in part interspersed by individual epithelial cells. Some localities presented softening and degenerative changes.

The other case concerned a boy of 17 years. At the autopsy the stomach was found to be adherent to the spleen, liver, and pancreas. The gastric mucosa was ulcerated to an extent of about two halves, corresponding to the lesser curvature, the anterior and posterior surface with a sharp transition to healthy tissue. There were small metastatic nodules on both diaphragmatic surfaces and on the hepatic surface; and enlarged glands at the greater curvature and in the mesentery. No bone metastases were found. Microscopical examination showed a large alveolar partly medullary cancer derived from the gastric mucosa, with corresponding metastases provided with a scanty stroma. (This case was peculiarly complicated by a tuberculous infection 7 years previously, and 18 days before death the diagnosis was tuberculous caries of the vertebral column; 10 days before death, a hard strand first became palpable in the left hypochondrium.)

CASE 9. Reported by L. Ruetimeyer. This observation concerned a boy 15½ years of age, who complained of gastric disturbances, pain after meals, later on vomiting about half an hour after eating; no hæmatemesis. About a year later, a tumor could be palpated below the umbilicus. The diagnosis was pyloric carcinoma.

Operative treatment was done in two stages: preliminary gastro-enterostomy followed in 4 weeks by pylorectomy and removal of gland bearing tissues. Two months later a return of gastric disturbance was controlled fairly well by medical means. At the end of 5 months, a recurrence was demonstrated to the right of the cicatrix. A gradual increase in symptoms and size of recurrence mass took place. The sudden rapid growth of a recurrence led to death. The duration of the disease was 3 years. Autopsy showed that the recurrence occupied the larger portion of the remaining stomach. There were numerous metastases in the liver.

CASE 10 (Ruetimeyer). The patient, a girl of 19 years, complained for 5 months of gastric disturbances in the form of spasms independent of meals, and gradually progressive vomiting. She had lost 20 pounds in weight during the last 6 months. She was treated for a long time medically for gastrectasis. Examination, after removal of the enormous contents from the fasting stomach, showed a distinct, hard, nodular, apparently freely movable tumor, below and to the right of the umbilicus, which seemed to belong to the pyloric region. The test meal yielded no free hydrochloric acid; lactic acid was present in large amounts; the pepsinogen was preserved. Operation showed a tumor of such dimensions as to render its extirpation impracticable. The growth occupied the pyloric region, lesser curvature, and posterior gastric wall, with numerous adhesions and multiple glandular metastases, as well as carcinomatous infiltration of the peritoneum. Gastro-enterostomy was performed and led to a satisfactory functional result. Death occurred about 2 months later, after the formation of a fæcal fistula through perforation of the tumor mass into the bowel.

CASE 11 (Ruetimeyer). The patient was a young woman of 23 years who had complained of gastric disturbances for 3 months, the stomach having been perfectly normal up to that time. A pressure sensation was felt over the stomach after eating, and the patient often experienced spastic sensations in the cardia and œsophagus, independently of the ingestion of food. There was much vomiting, but no hæmatemesis. A nodular tumor could be palpated in the pyloric region. Chemical findings showed the presence of hydrochloric acid and an absence of lactic acid. Operation revealed a large inoperable carcinoma of the pylorus and the lesser curvature. Death about 3 months later followed gastro-enterostomy.

CASE 12. Reported by A. Schminske. A boy of 16 years suffered from gastric cancer. The diagnosis could be rendered on the basis of a palpable tumor. Vomiting was

present, and fatty acids and blood were found in the gastric contents. The autopsy showed a large ulcer at the lesser curvature close to the pylorus. The floor of this funnel-shaped ulcer was white and cicatricial. The tumor masses enclosed and strictured the pylorus. There was thrombosis of the portal vein. The regional lymph glands were examined under the microscope. The condition was medullary carcinoma.

CASE 13. Reported by P. Anning. This was a case of carcinoma of the stomach in a boy of 19 years. Seven years ago the patient suffered a traumatism in the gastric region followed for a long time by pain in the epigastrium and signs of chronic gastritis. In the past 8 months the condition had become more acute with gastric pains and vomiting. Laparotomy showed a gastric tumor the size of a child's fist, adherent to the left lobe of the liver. There were numerous enlarged glands. Posterior gastro-enterostomy was done. Death from asthenia followed 3 months later. Autopsy findings: The tumor occupied the entire lesser curvature, as well as the upper portion of the greater curvature, nearly to the gastro-enterostomy opening. Carcinosis of the peritoneum had taken place, with metastases in the liver, the head of the pancreas, and the lymph glands. Microscopical examination showed a scirrhous cancer.

CASE 14. Reported by Huch. The patient was a boy of 15 years who worked as a saddler's apprentice. For 7 weeks he had vomited, and complained of pains below the left costal arch. One profuse gastric hæmorrhage occurred after his admission to the hospital. A thick nodular tumor could be palpated. Free hydrochloric acid was absent, but lactic acid was present. The diagnosis was malignant tumor of the stomach. Treatment consisted in gastro-enterostomy. The vomiting promptly recurred, and the patient died under symptoms of progressive cachexia, 15 weeks after the onset of the disease. The autopsy showed the stomach to be partly adherent to the diaphragm and the spleen. The pylorus was stenosed. At the greater curvature, between the center and the pylorus, was an ulcerated surface the size of a small palm, with irregular borders, deep erosion, and a floor covered with a blackish layer. Underneath this ulcer a tumor mass the size of a child's head could be palpated, reaching as far as the vertebral column. The tumor was adherent to the head of the pancreas and the left lobe of the liver. There were metastases in the lungs, liver, peritoneum, bladder, diaphragm, and ileum. Microscopical examination showed a medullary carcinoma.

CASE 15. Reported by Ghon. A specimen of cancer of the stomach derived from a boy of 13 years, was presented before the Vienna Society for Internal Medicine and Pediatrics, November 28, 1907. This gastric carcinoma had developed on the basis of an ulcer of the lesser curvature, which in its turn was the result of cauterization of the stomach wall through swallowing of caustic lye.

CASE 16. Reported by F. Karl. The patient was a boy of 9 years who weighed only 28 pounds and was practically skin and bones. The illness was of about 2 months standing and the chief symptom was vomiting of all food, with hæmatemesis. A hard, slightly displaceable tumor, tender on pressure could be felt in the pyloric region to the right of the umbilicus. Operation showed a fairly movable irregular tumor, the size of a child's fist, and the diagnosis of carcinoma could be rendered on microscopic inspection. The microscope revealed a small, cellular, infiltrating cancer, which had invaded all the layers of the gastric wall as far as the serosa. The operation was remarkably well tolerated, and the child made a good recovery, gaining 18 pounds in weight in 3 weeks, when he was discharged from the hospital. On inquiry 3 months later, the boy was found to be in good health, weighing 59 pounds. Karl expresses doubt as to the future course, in view of the general unfavorable experience in juvenile carcinoma in general and of the stomach in particular.

CASE 17. Reported by R. Schmidt. This was a case of gastric cancer in a medical student of 23 years, at whose autopsy a mucous ulcer of the stomach was found, which at one point presented typical strands of cancer cells penetrating into the submucosa and the muscular layer. Other findings consisted of a miliary carcinosis of the lungs as well as metastases in the bronchial mediastinal and retroperitoneal lymph glands.

CASE 18. Reported by W. B. Cosens. The patient was a German war prisoner, aged 18 years and 10 months, who reported himself sick with dyspepsia and vomiting. Five days later, he was found to be in a condition of profound collapse, with frequent vomiting and general abdominal pain. A smooth rounded tumor occupied the space between costal margin and umbilicus. When the abdomen was opened 3 days later, the liver was seen to be generally enlarged and stubbed all over with nodules; a small growth was discovered near the pyloric end of the stomach. There was no further operative interference. Death occurred about 4 weeks later. The gastric wall was found to be the seat of a new-growth having the histological structure of carcinoma of the scirrhous type, which had undergone almost complete necrosis, fibrosis, and calcareous infiltration. The liver was freely infiltrated by deposits of new-growth, the microscopical structure of which was that of a carcinoma. The stomach was undoubtedly the primary seat of the tumor.

CASE 19. Reported by R. G. Hussey. The patient, a white woman, aged 26 years, was admitted to the hospital complaining of stomach trouble, nausea and vomiting. The onset of the illness was about 4 months previous to admission, with progressive loss of appetite, weakness, and emaciation. For 2 months she had noticed a hard lump in the upper abdomen. Examination showed a sausage-shaped mass, smooth in outline, situated midway between the ensiform and umbilicus, freely movable, not tender, descending on inspiration. The clinical impression was "pyloric obstruction, probably carcinoma of the stomach and starvation." At laparotomy, 6 days after admission, the stomach was found to be involved in an extensive malignant process. Anterior gastrojejunostomy was followed by death 11 days after operation. The anatomical diagnosis was colloid carcinoma of the stomach, pyloric stenosis, and metastases in the regional lymph glands. Microscopically, the tumor cells varied in shape and size, but for the most part were cubical or cylindrical; they had large vesicular nuclei and their cytoplasm was frequently vacuolated.

CASE 20. Reported by D. A. Laird. The patient, a boy 15 years of age, without suggestive hereditary or personal medical history, complained of pain of a fortnight's duration, with occasional vomiting. There was a palpable epigastric tumor. The liver was enlarged, and there was a leucocytosis. Both test meal and vomitus showed absence of free hydrochloric acid. There was no X-ray evidence of value. Loss of weight was progressive and rapid. Laparotomy was performed and revealed an inoperable growth of the lesser curvature of the stomach with secondary nodules in the liver. Microscopical examination of glands excised from the mesentery showed a columnar-celled carcinoma. Death followed soon after the operation.

CASE 21. Reported by A. Galdindez. The patient was a boy of 15 years, whose illness began about 6 weeks previously with epigastric pains. Radiography revealed the presence of a tumor in the epigastrium. Surgical intervention showed a tumor of the greater curvature, adherent to the pancreas and omentum. A small growth was removed for biopsy, and the abdomen was closed.

Twelve days after the operation, the patient succumbed to cachexia, the disease having run its entire course in 2 months and 3 days.

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GENTIAN VIOLET SOLUTION INTRAVENOUSLY IN THE TREATMENT OF PHLEBITIS[1]

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THIS is a preliminary report on the intravenous injection of gentian violet[2] solution in the treatment of phlebitis. Although we have had only 5 cases so far, the results have been so striking as to justify the report.

Churchman, in 1912, demonstrated the selective bacterial action of gentian violet showing that it had a selective action on gram positive organisms. Thus the growth of the staphylococcus is inhibited by dilutions of 1:1,000,000. The bacillus subtilis is also inhibited while the colon bacillus is affected almost not at all. It has further been demonstrated that in dilutions of 1:50,000 gentian violet apparently has no effect upon white blood cells exposed to the solution for 2 hours. Growing human cells, grown *in vitro*, were not injured by dilutions of 1:20,000.

In a paper presented at the meeting of the Southern Surgical Association last December, Hugh Young reported some remarkable results obtained by the intravenous injection of mercurochrome and gentian violet solutions in various infections of the blood stream and also in localized infections. Gentian violet solution is indicated in infections with gram-positive organisms.

The most common infective organisms in phlebitis and thrombophlebitis are the pyogenic cocci, staphylococcus, and streptococcus. It, therefore, seemed rational to try gentian violet solution intravenously in this condition. The results that have been obtained in the few cases in which we have used it promise well. Brief reports of these cases are given. In two of the cases I gave the treatment myself, in two others Dr. Stringer, at the Wesley Memorial Hospital, gave the treatment under my direction and in the fifth case, Dr. C. E. Waits tried it. Dr. Stringer and Dr. Waits have kindly furnished me reports of their cases.

[2]Coleman and Bell's Gentian Violet was used.

CASE 1. Mrs. S., para-III, had an easy, spontaneous delivery, December 6, 1923; with no laceration, and no elevation of temperature at any time while in the hospital. She went home in an ambulance on the seventh day postpartum. On the tenth day she had some pain in the left groin and on the twelfth day her temperature went to 102 degrees. The pain became severe in the groin, thigh, and calf of the leg and necessitated the giving of ½ grain of codeine from two to four times daily for relief. The temperature ranged from 100 to 103 degrees for 4 days when gentian violet solution was given. In the morning 30 cubic centimeters of a 1 per cent solution were injected intravenously. No reaction followed. By night the pain began to subside and by noon of the following day the pain had entirely disappeared and the temperature came to normal and remained normal. A second treatment was given 2 days later as a safeguard, although the patient was free from all symptoms. In 5 more days she was out of bed and walking about. No blood culture was made.

CASE 2 (Dr. Stringer). Mrs. R., para-VI, entered the hospital for incision and drainage of an abscess of the right breast 6 weeks after delivery. Temperature on admission was 99.4 degrees. Four days after operation she complained of pain in the left leg. Next day the leg was swollen and tender and her temperature went to 101 degrees. The leg was elevated and a pressure bandage applied. This gave considerable relief. Two days later the temperature went to 100.2 degrees and on this day, 30 cubic centimeters of 1 per cent gentian violet solution were given intravenously. On the following day the patient felt much better and there was no pain or tenderness; the highest temperature was 100 degrees. Two days afterward the temperature came to normal. The blood culture was negative.

Observations by Dr. Stringer:

1. There was a definite phlebitis in the long saphenous vein of the left leg.
2. There was no reaction to gentian violet solution intravenously, and no thrombosis of the vein at the site of injection.
3. Prompt relief of pain and tenderness followed.
4. The subsequent temperature was subject to slight variations, but never above 99.4 degrees.
5. The picture was complicated by a concurrent abscess of the breast which showed no definite reaction to gentian violet.

CASE 3 (Dr. Stringer). Mrs. C., age 51, was operated upon December 18, 1923. A complete hysterectomy was performed under ether anæsthesia. On December 30 she complained of legs and

[1]Read at State Sectional meeting of American College of Surgeons, Atlanta, February 1, 1924.

back being painful and tender to pressure. The temperature went up to 102 degrees. Her temperature had varied from 99 to 101 degrees prior to this.

On January 3, the right leg was swollen and tender and the site of a definite phlebitis; the temperature, up to 102.2 degrees. January 5, a pus pocket in the incision was opened. January 6 to 14, the temperature varied from 99 to 100 degrees. The right saphenous vein became completely thrombosed and a red line marked its course. The leg was swollen and very tender to pressure. January 14, tenderness and pain developed in the left leg. Gentian violet, 30 cubic centimeters of 1 per cent solution, was given at 3 p.m. The temperature rose to 100.3 degrees at 8 p.m. January 15, she felt better and was able to move the legs. There was less tenderness, and the right leg was less swollen. There was no trouble in the left leg. January 16, the temperature was normal all day. She felt better than at any time since operation. January 17, a second dose of gentian violet was given. January 18 to 28, the temperature was normal and legs free from pain.

Observations by Dr. Stringer:

1. Phlebitis developed in the right leg 14 days after operation. Later tenderness developed in the left leg. There was complete thrombosis of the right long saphenous vein.

2. Gentian violet was given intravenously on the twelfth and fifteenth days after the onset of phlebitis and after thrombosis had occurred.

3. Rapid loss of pain and tenderness and swelling in both legs followed the intravenous injection of gentian violet solution.

4. The moderate reaction to treatment was probably due to the highly nervous type of patient.

CASE 4 (Dr. Waits). Miss A. H., age 30, entered the hospital on January 9, with a history pointing definitely to a subsiding attack of acute appendicitis. At operation, on January 10, this diagnosis was confirmed, the appendix being acutely inflamed throughout its distal one-half and containing two or three fæcal concretions. Suppuration had not occurred. Appendectomy was done and the peritoneal cavity closed without drainage. A rubber wick drain was placed in the fat at the lower end of the wound because of possible contamination. The postoperative course was smooth and uneventful up to the twelfth day, at which time the patient was removed home. On the afternoon of the twelfth day she complained of pain and swelling in the left leg and thigh; and her temperature was 101 degrees. There was tenderness throughout the course of the vein and moderate swelling. The patient was again put at complete rest, with the leg bandaged and elevated. Gentian violet, 20 cubic centimeters of 0.5 per cent solution, was given intravenously. One hour later the patient complained of chilly sensations but no definite chill. The temperature was 102 degrees. Twenty-four hours later the temperature was normal, and the swelling in the leg had subsided markedly. There was also much less tenderness along the course of the vein. All swelling and tenderness subsided completely within 7 days after the injection, and the patient has had no further trouble. The promptness with which the phlebitis subsided we believe was due to the use of the gentian violet solution.

CASE 5. Mrs. H., para-I, had a postoperative febrile course of 10 days after cæsarean section. A blood culture was negative. The patient went home in 3 weeks. Two weeks later, after being up and about, she developed pain in the left groin and later in the calf of the left leg with elevation of temperature and a well defined phlebitis. Gentian violet, 30 cubic centimeters of 0.5 per cent solution, was given intravenously on the second day and 45 cubic centimeters of 0.5 per cent solution were given on the fourth day. There was amelioration of symptoms after the first dose but the fever continued. After second injection all pain disappeared and the temperature came to normal and remained so.

In giving the gentian violet, and we have given it many times for various other infections besides phlebitis, we at first used a 1 per cent solution. We found that this often caused a thrombosis of the vein at and above the site of injection. Recently we have used 0.5 per cent solution and have given larger amounts. The solution is prepared by dissolving gentian violet in sterile freshly distilled water and it is probably best to filter it. Sterilization of the solution is not necessary. The maximum dose is 5 milligrams per kilo of body weight. We have not noted any bad symptoms or reactions. Some of the patients have manifested nervousness and have complained of weakness. Sweating was frequently observed. A bluish tinge to the skin simulating cyanosis usually appears, but passes off in a short time. The treatment can be repeated several times at 2- or 3-day intervals.

No complication of surgery is more distressing than phlebitis. It usually makes its appearance at about the time when the patients are well along in their convalescence. It retards the convalescence by many days and weeks, often causes much pain and discomfort and may lead to much more serious consequences and even death. Very frequently more or less permanent disability follows.

Definite conclusions cannot be drawn from 5 cases but if our results can be borne out by subsequent trial it would seem that in gentian violet we have a remedy that promises to be of great assistance in combatting and aborting phlebitis.

ABSCESS AND GANGRENE OF THE THYROID GLAND[1]

By MOSES BEHREND, M.D., F.A.C.S., Philadelphia

THE apparent rarity of cases of abscess and gangrene of the thyroid gland, especially of gangrene, prompts the writer to report 3 such cases, 2 of abscess and 1 of gangrene. There is little literature on the subject, some textbooks giving it just a passing mention. No doubt all cases that occur are not reported on account of the preponderance of other thyroid affections which overshadow the seeming unimportance of the acute inflammatory affections of this gland. While abscess of the thyroid gland may be considered a rare condition, gangrene of the gland must be considered almost an anomalous disease. In the experience of the surgeons connected with the Jewish Hospital in the past 35 years 2 cases of abscess (Dr. Teller's and the writer's) and of gangrene were observed. One case of abscess of the thyroid gland was operated upon in the Mt. Sinai Hospital.

More attention should be paid to these acute affections and more cases should be reported so that the symptoms and signs may be recognized more readily. On account of the grave complications that may arise a knowledge of the anatomical arrangement of the cervical fascia is essential.

The thyroid gland receives an investment of the middle lamella of the deep cervical fascia from either side of the neck; the two layers meet and are continued down the neck through the thorax until they become continuous with the fibrous layer of the pericardium. Because of this arrangement of the fascia, it must be evident that temporizing is dangerous in these acute affections; the earlier the diagnosis is made the better; the quicker the gland is incised and drained the more surely will complications be prevented. The great dangers are perforation of the trachea, œsophagus, the great vessels, and the mediastinum.

DIAGNOSIS

The main factors in making a diagnosis are the signs of inflammation, redness, swelling, and œdema of the overlying tissues in the median line in the region of the thyroid gland. These are the primary manifestations, which if allowed to continue will soon be followed by dysphagia, dyspnœa, congestion of the face, epistaxis, nausea, vomiting, and delirium (DaCosta). Pain varies according to the degree of inflammation. Fever, chills, headache, and temporary hoarseness may occur.

The prognosis must always be guarded. If the patient is seen early and proper treatment is instituted there is practically no danger from abscess of the thyroid gland. Late cases are always serious on account of the burrowing of the pus, especially when it breaks through the cervical fascia and enters the mediastinum. Cases of gangrene are almost always fatal. In favorable cases inflammations of the gland do not go to suppuration.

Infections of the thyroid gland are rarely primary. Inflammatory conditions may follow any infectious disease, such as puerperal fever, influenza, erysipelas, orchitis, and acute inflammatory rheumatism (Ochsner).

The writer's cases follow.

Case 1. Abscess of the thyroid gland. M. L., age 54, female, was admitted to the Jewish Hospital, May 29, 1920. She was discharged as cured June 6. Six days before admission she complained of headache. The following day there was pain over the thyroid gland. Inflammation and swelling followed. The pain became unbearable. There was present the typical swelling of the neck in the median line. The overlying skin was red, swollen, and œdematous. Under gas and oxygen anæsthesia the gland was incised and drained.

Case 2. Abscess of the thyroid gland. N. P., age 36, male, was admitted to the Mt. Sinai Hospital, May 31, 1923. This patient walked to the receiving ward complaining of dysphagia, dyspnœa and swelling in the region of the thyroid gland. The diagnosis was readily made, the gland was at once incised and drained. His recovery was immediate, and the patient left the hospital 3 days after admission.

Case 3. Gangrene of the thyroid gland. L. S., age 40, was seen in consultation 3 days after his sickness began. We found a robust man with a rather large swelling on the ventral aspect of his neck. While the neck was moderately swollen, especially over the thyroid gland, the patient did not seem to be in a precarious condition. The following

[1] Read before the Hospital Conference, Jewish Hospital, May, 1923.

day the picture changed. The entire circumference of the neck was enlarged, the œdema extending to the chin. His face was suffused, congested, and bluish in color. He was dyspnœic and in great discomfort; however, he did not complain. A few hours before operation he developed a symptom which we considered of great import; that of cough and expectoration of a foul smelling sputum. A perforation of the trachea had occurred.

The operation was performed under local anæsthesia, novocain one-half of one per cent being used. Four incisions were made across the neck, extending from the hyoid bone to the suprasternal notch. At the level of the incision made in the thyroid gland a dark black background was noticed. The finger felt the trachea which was bare, the pretracheal fascia apparently having been destroyed. After operation the patient collapsed, the pulse became hardly perceptible, and he was cold and clammy. Next morning the condition was somewhat improved. It was thought that he had a chance to recover but toward evening he became delirious. The following day found him in better condition, but he was still coughing and expectorating sputum of the character described above. The wounds were unhealthy and foul smelling. The night of the second day following operation he became violently delirious and was restrained with great difficulty. He died early in the morning of the third day following operation.

G. Beilby reported three cases of thyroiditis secondary to other infections. These developed pus. Two cases occurred in normal glands, the other in a cystic adenoma of the thyroid. He claims that the rare occurrence is difficult to explain on account of the close proximity of the thyroid gland to the pharynx, tonsils, and lymphatic structures which might be expected to predispose to infections within the thyroid by direct lymphatic extension.

CASE 4 (Beilby). In a man, age 64, laryngitis and tracheitis preceded the thyroid condition by 3 weeks. Then he developed a chill, high temperature, and pain in the throat. A diagnosis of acute thyroiditis was made. Extreme dyspnœa and dysphagia were present. Under local anæsthesia the gland was incised and 50 cubic centimeters of thick yellow pus exuded. Recovery was rapid.

CASE 5 (Beilby). A man, age 48, had had sore throat 5 weeks previously. He had a chill and some febrile symptoms. A laryngologist made a diagnosis of acute thyroiditis. The patient suffered from an extreme degree of pressure upon both trachea and œsophagus. The gland was opened under local anæsthesia. The patient left the hospital a week later.

CASE 6 (Beilby). Enlargement of the thyroid gland in this patient occurred 4 years ago after childbirth. Three months before admission she had a severe attack of influenza. The neck became swollen and painful; she had a rise of temperature every day, and developed a chill followed by dyspnœa and dysphagia. She was septic and in a serious condition. The diagnosis was infected adenoma of the thyroid gland. The gland was opened under local anæsthesia and a large amount of purulent fluid and blood were evacuated. Culture showed streptococcus hæmolyticus.

Beilby believes the pathognomonic sign is the stony hardness of the gland elicited on palpation; no other condition except carcinoma gives a similar feeling.

CASE 7 (Cipialini). Cipialini reports a case of abscess of the thyroid gland secondary to mastoid abscess.

CASE 8 (E. A. Treacy). Thyroiditis with abscess formation followed the administration of thyroid extract. A widow, aged 51, with moderate sized goiter was given one-half gram desiccated thyroid after each meal. After 1 week the right lobe became painful and the treatment was stopped. After 2 weeks the painful lobe became reddened and opened spontaneously with bread and water poultice. The lobe sloughed and the dead thyroid tissue was removed. Healing occurred in 4 months.

These are the only cases that could be found in the literature of abscess of the thyroid gland. Not a case of gangrene was reported. Ochsner states that about 7 cases have been reported but he gives no reference to them.

CONCLUSIONS

1. Early diagnosis is important.
2. The characteristic signs of inflammation with swelling in the mid-line of the neck in the region of the thyroid gland should help to make the diagnosis.
3. Early incision under local anæsthesia is important on account of the proximity of the cervical fascia and its relation to the mediastinum.
4. Early incision prevents the serious complications of perforation of the trachea, œsophagus and mediastinum.

I wish to acknowledge my indebtedness to Dr. M. Winston for reviewing the literature.

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CHOLECYSTOGASTROSTOMY AND CHOLECYSTODUODENOSTOMY

By F. G. DuBOSE, M.D., F.A.C.S., Selma, Alabama
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THE end-result in gall-bladder surgery is unsatisfactory. Repeated operations for recurrence is a reflection on surgical efficiency. The dispute as to operation of choice is unsettled. The percentage of cures is too low.

A report of the experience with cholecystenterostomy, covering a period of 11 years and including 20 cases, is probably worth while in the present unsettled treatment of gall-bladder disease. It is significant of neither method being ideal that the adherents of cholecystectomy and cholecystostomy are still disputing the relative value of each, and surgeons of wide experience are partisan, some to the one and some to the other method.

The gall bladder is a functioning, not a vestigial organ. It is admitted generally that it concentrates bile, secretes mucus, and is a reservoir for storage of bile. Additional evidence of function is that its removal is followed by compensatory hypertrophy of common and hepatic ducts. It should be conserved when possible. Because no serious digestive disturbance has followed its removal is of itself no excuse for its indiscriminate ablation. Because its functions are not completely understood is no argument that its office is unimportant in the human economy. The gall bladder figures less and less as the cause of gall stones, jaundice, and biliary infection (18), as more is known of liver cell action, normal and pathological. In the etiology of cholelithiasis, endocrine dysfunction (20) and consequent general systemic metabolic errors appear as causes even more remote than disturbances of the liver cell itself. The pollution of the blood, and the lowered functional capacity of the hepatic cell are the precursors of gall-bladder disease, hence this biliary diverticulum is rather a participant in the pathological process than its prime factor. It is temptingly surgical because easily operated upon. The fact is that gall-bladder infection is a secondary, never a primary, infection, and when its severity puts it in the ascendancy, urgent surgery is required; this, when done, is only a part of the necessary treatment. Subsequently, a search for and removal of the primary infection must be accomplished before the melancholy and all too frequent recurrence following either radical or palliative gall-bladder surgery will be lessened or prevented. It has been tersely put that operations on the gall bladder are operations on the end-products of the factors producing gall-bladder disease.

Cholecystoduodenostomy and cholecystogastrostomy have been operations of necessity rather than of choice. It remains to be seen after a study of many hundreds of cholecystenterostomies whether after all it is not the operation of choice.

The *contra-indications* are: (1) cancer or other gall-bladder neoplasms, (2) gangrenous cholecystitis, (3) atrophic or contracted gall bladder, and (4) cystic duct occlusion or obstruction other than stone.

The *indications* are:

1. Common duct obstruction in patients who are poor surgical risks from extreme illness, complications or associated physical diseases. When safety first is regarded, cholecystenterostomy is the best remedial measure available (3).

2. Residual hepatic duct stones when secondary common duct obstruction is a probability. In these cases cholecystectomy is contra-indicated, and also cholecystostomy because a continuous and perhaps complete external flow of bile may result (3).

3. Chronic or intermittent jaundice of obscure origin; or jaundice secondary to inoperable diseases of the liver, pancreas, or duodenum, causing obstruction to the common duct (3).

4. Perforation of the gall bladder. Cholecystenterostomy is safer than cholecystectomy and gives a more rapid convalescence than cholecystostomy (3).

5. External drainage consequent to operations on the upper abdomen after the removal

of gall stones. Anastomosis is safer and simpler (3) as illustrated in Case 4.

6. Perforation of a pyloric or duodenal ulcer. The chance is lessened of constricting the lumen and promoting healing of the ulcer area by bathing it continuously with the alkaline bile (3).

7. Persistent pylorospasm from hyperacidity unrelieved by medical treatment (3).

It is claimed by Sippy that the alkalinity of the bile is insufficient to counteract the persistent gastric hyperacidity. The hydrogen-ion concentration of gastric juice is 1.0; that of bile from the gall bladder is 7.4. The average daily secretion of gastric juice is 1,500 cubic centimeters. The average daily secretion of bile is approximately 1,000 cubic centimeters. It therefore follows from its hydrogen-ion concentration, and from the relative amounts secreted, that the contention of Sippy is justifiable, since it would take seven to nine times as much bile to completely neutralize the gastric juice as that secreted. However, this contention is largely academic, since many other factors enter into the neutralization of gastric acidity, notably the ingestion of protein foods.

8. Acute pancreatitis. Cholecystenterostomy permits of free drainage of bile, yet conserves it for the patient's use, and is to be preferred to either cholecystostomy or cholecystectomy. In Case 12 cholecystoduodenostomy was done for this condition, with excellent immediate and remote results.

Cholecystenterostomy should supersede cholecystostomy as a routine measure because, since bile follows the path of least resistance, frequently in inflammatory conditions of the bile ducts following cholecystostomy practically the entire output of the liver is lost in drainage; and a condition of acholia results with the gravest consequences to the patient, death usually supervening. We have had personal experience with such cases with fatal issue, and in other cases have felt that death was avoided by the performance of a cholecystenterostomy, particularly in Case 16 of this report.

It should also supersede choledochotomy, or plastic surgery in cases of stricture (other than stone) of the biliary ducts as being a simpler, safer, and equally efficient method in its final outcome for remedying the conditions named. It is tersely stated by White (21) that cholecystenterostomy "invariably helps a patient in very grave straits, and provides a simpler way out for the surgeon."

A serious consideration of the above indications is pertinent at this time, because the study of thousands of cases of gall-stone operations shows that less than 75 per cent of the cases operated on are cured. The Mayos report 53 per cent cured following cholecystostomy, and 71 per cent following cholecystectomy. The chances are greatly lessened for relief of the 25 or 30 per cent of "ectomies" who are subjected to second operations, because the previous removal of the gall bladder prevents the utilization of the gall bladder as a shunt circuit duct or the provision of a dual opening for the escape of bile from the hepatic duct.

The majority of surgeons are choosing cholecystectomy rather than cholecystostomy as a routine measure; but no contention will be made in this paper as to the relative value of the two operations. Statistically, cholecystectomy as a routine is preferable, but since both have such a high percentage of failures, it is apparent that some better method is greatly needed. Possibly, with increasing numbers of cases reported, cholecystenterostomy, never a popular procedure, though introduced as early as 1880, may yet be in the ascendancy as the operation of choice in gall-bladder surgery. It covers a very wide range of useful application, apparently without the disadvantages of either cholecystectomy or cholecystostomy. Probably experience will prove that it is as useful in gastric ulcer as is gastro-enterostomy. As a routine measure in the hands of the less skilled, it will occupy a position of greater safety than either cholecystectomy or reconstructive duct surgery.

The 20 cases presented cover a varied application of this operation. Determinative conclusions cannot be drawn from this number of cases, but when these are added to those already on record and to those which may be reported, and when a careful study of the end-results is made, the true value of the operation may be correctly estimated.

The operative technique described has been efficient in all of the cases reported, and in no case has there been a leakage or failure from a technical standpoint.

A rubber tube, No. 16 or 18 French scale, is inserted into the fundus of the gall bladder and held by a catgut purse-string suture which passes through all coats of the gall bladder, and transfixes the tube itself to hold it in position. The first suture is also a hæmostatic suture. A second running Lembert circular suture invaginates the first suture line. The gall bladder is then attached to either the stomach or duodenum by a linen or Pagenstecher thread. For obvious reasons care is exercised to avoid traction on either the duodenum or stomach at the point of approximation. Sometimes a cholecystogastrostomy is out of the question, because of the relative position of the stomach and gall bladder. In these instances a cholecystoduodenostomy is the operation of necessity rather than of choice.

As soon as this line has completely approximated the gall bladder and stomach or duodenum, a second suture of catgut is similarly placed, the ends being left long. Three sutures are introduced into the stomach or duodenum in such a way as to make a triangle, the center of which is the proposed opening into the stomach or duodenum. With these held taut, by slight traction on the tube in the gall bladder, an incision is made through the serous and muscular coats down to the mucous membrane. The mucosa is caught up and held between two forceps and opened, the clamped end of the rubber tube is inserted, and a circular purse-string introduced into the mucosa is drawn tight and tied. This is a hæmostatic as well as a fixation suture, most important because of its hæmostatic effect. A second purse-string suture of catgut runs through the serous and muscular coats and invaginates them over the tube and is tied, and the ends are then tied to the second gall-bladder purse-string, the ends of which were also left uncut. The peritoneal coats of the stomach and gall bladder are then closely approximated by continuing and completing the catgut suture uniting the gall bladder to the stomach, and the original linen suture is also completed, approximating the gall bladder and stomach

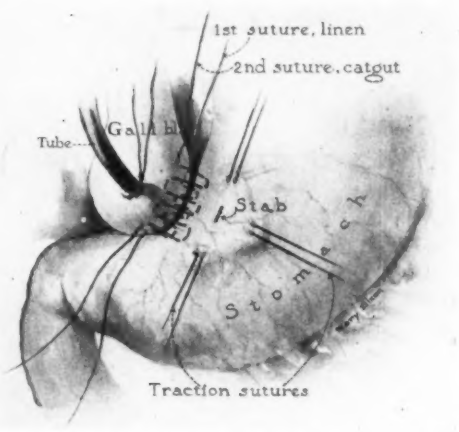

Fig. 1. Tube inserted into fundus of gall bladder and first and second and traction sutures placed.

securely. This constitutes the fourth tier of sutures around each stoma, the second tier uniting the stomach to the gall bladder. An omental graft is then placed entirely around the suture line for complete protection.

Judging from the end-results of several hundred cases of my own and of many other surgeons I believe that gall-bladder surgery, even in the hands of the masters in this field, is the least satisfactory of all surgery, except that of the brain.

It is urged that a more intensive study of these cases and of contributions on this subject be made, for the purpose of standardizing the teaching of gall-bladder surgery. We must rely finally on the judgment of the individual surgeon as to when the gall bladder should be removed, when it should be drained, and when it should be anastomosed either with the duodenum or stomach. The soundness of this judgment has as its basis either a wide personal experience or the adoption of a standardized surgical procedure.

When an operation is done as a last resort in an unfavorable case and is followed by unexpectedly good immediate results and gives long continued freedom from somatic symptoms the surgeon will remember that operation with pleasure. Repeated experiences with so good a means in times of dire need will increase its estimated value. Varied

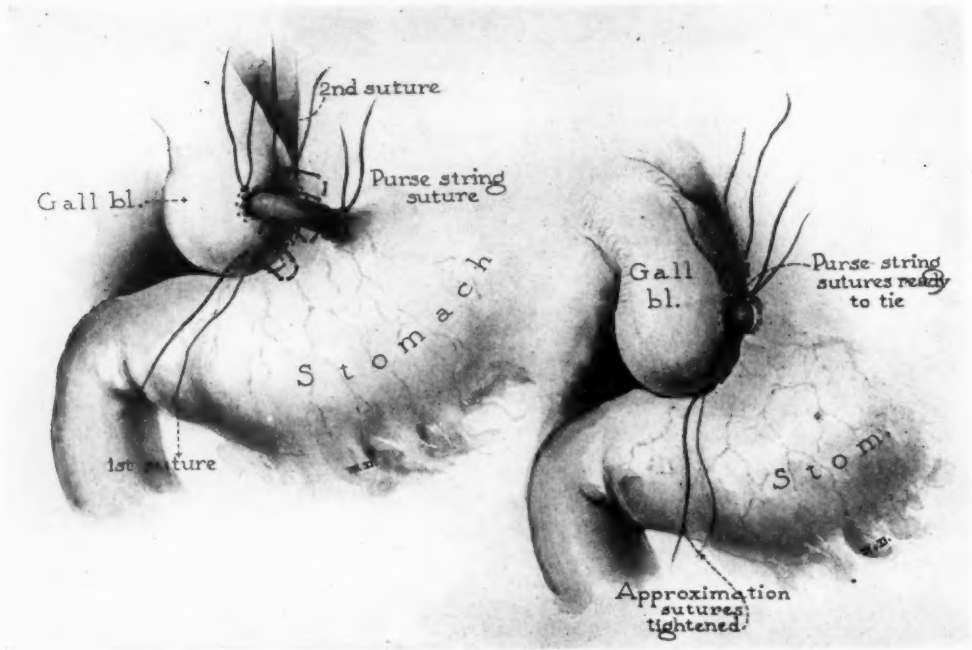

Fig. 2. Placing and tightening the purse string sutures and tightening the approximation sutures.

application under like conditions with unvarying success will cause an appreciation which must express itself. With this explanation, I beg your pardon for the effort, if it may be so considered, of seeking to popularize the operations, cholecystogastrostomy and cholecystoduodenostomy.

EPITOME OF CASES

CASE 1. Mrs. W., age 65 years, came in March, 1911, with jaundice. A diagnosis was made of suppurative gall bladder with stones. The patient collapsed under the general anæsthetic. The interrupted operation consisted of simple drainage of the gall bladder with removal of stones. A biliary fistula persisted 3 months. At a second operation, June, 1911, all stones were removed including one in the common duct. A biliary fistula persisted over a period of 2 years. The health was very poor. At times the patient had white stools, at other times there was bile in the stools. When the fistula closed, chills and fever supervened. In May, 1913, a cholecystoduodenostomy was done. Complete relief from all symptoms and general improvement in health followed. The patient was well in 1923.

CASE 2. Mrs. D. A. K., age 60 years, was operated upon January 28, 1916, for recurrent and almost chronic jaundice. She was emaciated and enteroptotic. Pain and other symptoms were confined to the upper right quadrant. The pre-operative diagnosis was cholecystitis, probably with stones. At operation no stones were found. The gall bladder was thickened. There were no adhesions. Cholecystoduodenostomy was done. The convalescence was uninterrupted. Except for pneumonia in 1919, she has been in perfect health, has gained 40 pounds in weight, and has complete relief from all symptoms.

CASE 3. Mrs. B., age 45 years, had had digestive disturbances and recurrent gall-bladder attacks attended with fever and jaundice for years. Operation was performed July 23, 1917, for removal of stones from gall bladder and cystic duct, no obstruction being found in the common duct. Cholecystoduodenostomy was done. The convalescence was uninterrupted. When last heard from in 1922, she had had no recurrence of any symptoms.

CASE 4. Mrs. G., age 40 years. On March 26, 1917, a pre-operative diagnosis was made of chronic appendicitis, lacerated perineum, and retroversion of uterus. During the course of the operation gall stones were found, and because digestive disturbances were in the ascendency, a cholecystogastrostomy was done coincident to the removal of the appendix, suspension of the uterus, repair of the perineum, and extraction of diseased teeth. In

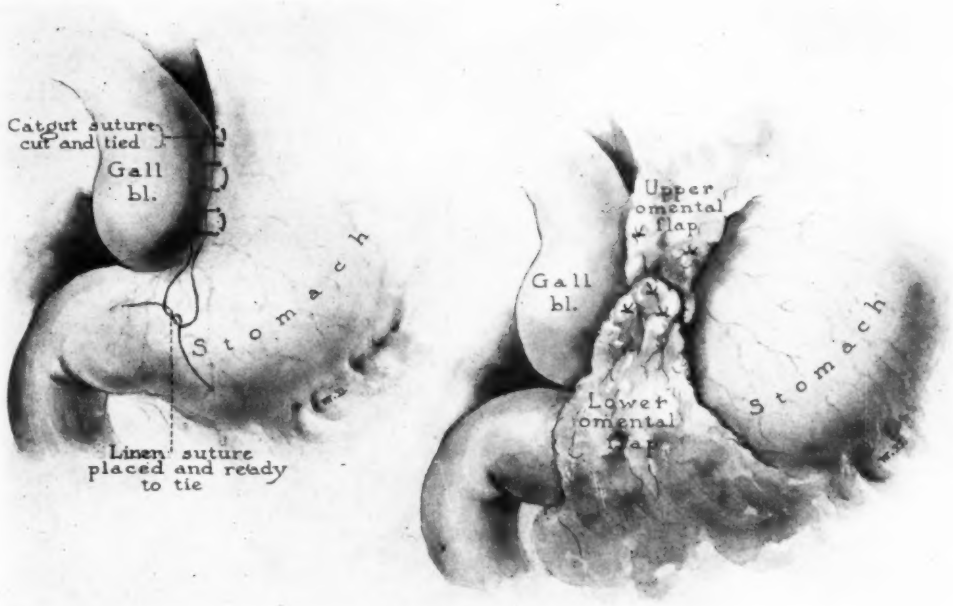

Fig. 3. Final steps in operation.

spite of the multiplicity of surgical operations, she had a perfectly normal course and has been entirely relieved symptomatically.

CASE 5. Mrs. H., age 50 years, suffered from recurrent gall-bladder colic, with slight jaundice, occasional fever, gas, belching, and digestive disorders in the intervals between attacks. At operation, February 26, 1918, stones were removed from the gall bladder, and cholecystogastrostomy was done. She reported complete relief from all symptoms in 1922 when last heard from.

CASE 6. Mrs. W. H. W., age 65 years, was operated upon for gall stones on June 1, 1918. The stones were removed, and cholecystoduodenostomy was done. An uneventful convalescence and complete relief from all symptoms followed.

CASE 7. Mrs. C. R. P., age 55 years. A preoperative diagnosis was made of chronic cholecystitis with stones. She had had indigestion, colic, slight jaundice, and fever (during some of the attacks), for a period of several years. She was extremely nervous. The general health was bad. Operation showed thickened inflamed gall bladder with stones. The stones were removed. Cholecystoduodenostomy was done. In 1923 the patient reported that she had been in perfect health since the operation.

CASE 8. Mrs. J. T. H., age 50 years. A preoperative diagnosis was made of gall-stone colic. She gave a history of colic, indigestion, slight jaundice, and sometimes fever during attacks. Operation was performed July 1, 1919, in an interval between attacks. Stones were removed from the gall bladder. Cholecystogastrostomy was done. An uneventful convalescence followed. There had been no recurrence of symptoms when she was last heard from in 1923.

CASE 9. Mrs. R. L. R., age 50 years, was admitted to the hospital January 6, 1920. For several years she had suffered with recurrent attacks of gall-bladder colic. The pre-operative diagnosis was acute cholecystitis with stones. At operation the gall bladder was aspirated, and the stones removed. Cholecystogastrostomy was done. Rapid and unusually smooth postoperative recovery followed and she reports complete absence of all symptoms for the 3 years since.

CASE 10. Mr. W. T. A., age 45 years, had jaundice during the Spanish-American War while serving as a soldier. His health and complexion were bad. He had recurrent attacks of upper right abdominal pain. Colic and digestive disturbances continued. Pre-operative diagnosis of gall stones was made. Cholecystotomy with removal of stones was done in 1913, and was followed by very little relief from any symptoms. A second operation was done June 21, 1921, under local anæsthesia. Two stones of moderate size were removed from the gall bladder at this time. The common duct was not obstructed. Cholecystogastrostomy was done, and postoperative hernia was coincidentally repaired. In the two and

one-half years since the operation, the patient has been in robust health. All digestive and other symptoms have disappeared without a recurrence in the interval since operation.

CASE 11. Miss A. S., age 65 years, was admitted to hospital February 1, 1921, with pre-operative diagnosis of gall-stone colic. The stones were removed. Cholecystotomy was done. The symptoms recurred and she was admitted September 21, 1921. During the interval between operations she had had gall-bladder attacks, indigestion, sense of weight over gall bladder, and slight jaundice. At the second operation, September 22, 1921, cholecystogastrostomy was done under local anæsthesia. Except for an attack of pneumonia in 1923, she has been in perfect health since this operation.

CASE 12. Mrs. H. H. T., age 35 years, was operated upon for gall stones, April, 1921. Many small stones were removed. Cholecystotomy was done. She was readmitted to the hospital August, 1921, with right upper and epigastric pain, nausea, vomiting, and elevation of temperature. A mass was felt in the right epigastric region. A pre-operative diagnosis of pancreatitis was made. There was a very large pancreas. Operation confirmed the diagnosis of no stones in the gall bladder or common duct. Cholecystoduodenostomy was done. Rapid convalescence followed. She was discharged 19 days after operation. She reported no recurrence of any symptoms whatsoever up to December, 1923, and a gain of 30 pounds in weight.

CASE 13. Mrs. McC., age 48 years, was operated upon December, 1921, for stones. Cholecystotomy was done. Upper abdominal pain, indigestion, slight icteric tinge, occasional nausea and vomiting continued. A second operation was performed January 26, 1922. No stones were found. There were no unusual adhesions, but some were found between the gall bladder and abdominal wall. Cholecystogastrostomy was done. Up to December, 1923, she has been permanently relieved of all digestive symptoms, has gained flesh, and the complexion is clear.

CASE 14. Mrs. J. S. F., age 63 years. The pre-operative diagnosis was cholelithiasis with stone in the common duct. Operation was performed December 28, 1922, under gas-oxygen-ether anæsthesia. There was a distended gall bladder the size of an orange filled with small stones. One stone the size of a pea was in the common duct. Stones were removed. A longitudinal incision was made in order to remove the stone from the common duct. The wound was sutured. Cholecystogastrostomy was then done. A rubber drain was inserted through a stab wound. Uninterrupted convalescence followed. Discharged on the nineteenth day. The patient reported complete relief from all symptoms December, 1923.

CASE 15. Mrs. L. H., age 60 years, March 9, 1923. The pre-operative diagnosis was cholecystitis. There had been typical gall-bladder colic at intervals of every two or three months for several years. Each attack was attended with jaundice rather pronounced. At operation a thickened gall bladder was found, with no stones either in the gall bladder, cystic, or common duct. There was a slight obstruction, which was probably a stricture just below the junction of the hepatic and cystic ducts. Cholecystogastrostomy was done. Convalescence was uninterrupted, and the jaundice cleared up. There was some slight digestive disturbance six months after operation, but no attacks of jaundice and no trouble referable to gall bladder occurred after operation. The patient was heard from in November, 1923.

CASE 16. Mr. P. O'F., age 73 years. The pre-operative diagnosis was suppurative cholecystitis and cholelithiasis. The patient had had fever and jaundice. Operation was performed May 24, 1923, under local anæsthesia. A very large gall bladder was found filled with stones and pus. One stone measured 2 inches in diameter. The stones were removed, and cholecystostomy was done. The post-operative convalescence was rather stormy, attended with delirium, and after the fifth or sixth day enormous amounts of bile were drained out. The patient's condition seemed good, except for an increasing debility. On account of his age and from previous experience, I was afraid of complete acholia with a fatal outcome. On June 5, 1923, under local anæsthesia, cholecystogastrostomy was done. Twenty-four hours later, the stools which had been white, were bile-colored. Uneventful convalescence followed. December, 1923, the health was good.

CASE 17. Mr. D. S. W., age 45 years, was admitted to the hospital with temperature of 105 degrees, rigors and sweats. He was severely jaundiced, and had right upper abdominal pain. Seven years before he had been operated on for appendicitis, and had had his gall bladder drained. The pre-operative diagnosis was acute suppurative cholecystitis with stones. At operation, June 26, 1923, under local anæsthesia, a distended thickened gall bladder the size of a large hen's egg was found containing bile and pus. The common duct was found to be strictured. No stones were in the common duct, there was no pancreatitic enlargement. Cholecystogastrostomy was done. Temperature was normal on the third day. Convalescence was rapid and uneventful. In December, 1923, he gained 20 pounds in weight, and is now in better health than at any time in the last 10 years.

CASE 18. Mr. I. Y., age 64 years, had a cholecystotomy and appendectomy done in 1917, with temporary improvement followed during the past 3 years by recurrence with increasing severity of indigestion, heart burn, eructations of gas, slight jaundice, and irregular fevers. He has been under treatment by various stomach specialists, duodenal tube drainage of the gall bladder being done. Each treatment was followed by slight improvement which persisted for several months, with a recurrence of all previous symptoms. After a gastro-intestinal X-ray examination, and other routine examinations, it was found that his liver was definitely enlarged and

tender. On account of an unusual amount of epigastric pain, it was thought best to operate after a period of observation in the hospital. He had two severe attacks of dyspnœa with profuse sweating, pallor, and weakness of pulse. These attacks were thought to be due to gall-bladder colic or pylorospasm. Atropine was followed by relief in each instance. When the abdomen was opened, June 30, 1923, under gas-oxygen-ether anæsthesia, a few dense adhesions were found between the gall bladder and abdominal wall, a result of previous operation, and some adhesions between the gall bladder and stomach and duodenum. The gall bladder was thickened, and distended, but no gross pathology was discovered. There were no stones, and no signs of ulcer of either stomach or duodenum. Cholecystogastrostomy was done. The postoperative course was smooth and uninterrupted until the fourth day, when he suddenly had a profuse hæmorrhage, apparently from his stomach, and died. Postmortem examination showed aneurism of the aorta had eroded into the œsophagus just above the diaphragm. Anastomosis between the gall bladder and duodenum was found to be firm and satisfactory. There were no signs of infection of peritonitis. The cause of death was an unrecognized aneurism of the aorta. This is the only death in the series, and should not properly be classed as such in this report.

CASE 19. Mr. C. M. J., age 54 years, had chronic jaundice, and had had two severe attacks of acute jaundice, and several attacks of right upper abdominal pain. The pre-operative diagnosis was cholecystitis, cholangeitis, and chronic appendicitis. Operation was performed August 3, 1923, under gas-oxygen-ether anæsthesia. The gall bladder, which was very thin, was distended. The liver was enlarged. The appendix had a dense adhesion at the base. Appendectomy and cholecystogastrostomy were done with anastomosis about ½ in. above the pylorus. Uneventful convalescence followed. He was discharged 21 days after operation. The jaundice completely disappeared.

CASE 20. Mrs. W. R., age 55 years, was operated upon years ago for pelvic inflammation. She was in poor health previous to and following the operation. She had repeated attacks of acute indigestion, some of which were attended with rigors and elevation of temperature. She has had three definite attacks of jaundice, one having been very severe. The pre-operative diagnosis was acute cholecystitis with stone, made May, 1923, after complete gastrointestinal X-ray and other examinations. The patient refused operation until after an acute attack November 20, 1923, attended with rigors, fever, and jaundice. The diagnosis at this time was acute suppurative cholecystitis. Operation was performed under local anæsthesia. The gall bladder contained 190 stones, with white bile. No stones were found in the common duct. The stones were removed, and cholecystogastrostomy was done. Convalescence was uninterrupted.

CASE 21. Mrs. J. B. P., age 60 years, had repeated attacks of gall-bladder colic attended with slight jaundice. A complete X-ray examination was made 2 years previously with a diagnosis of chronic cholecystitis, probably with stone. During the 2 years she had had three or four attacks of gall-bladder colic, each attack attended with slight jaundice, and there had been fever in the last attack. November 30, 1923, a cholecystogastrostomy was done. No stones or other signs of obstruction were found in the biliary tract. The head of the pancreas and stomach were normal. The cause of the gall-bladder colic was obscure with reference to everything except the gall bladder itself, which was bilocular. A partition of membrane, probably of inflammatory origin, made the gall bladder bilocular. This, no doubt, was the cause of her attacks of colic, as the opening between the two sections of the gall bladder was too small to admit a drainage tube. The partition was incised and sutured around the tube. The convalescence has been uninterrupted.

No final report can be given as the patient is still in the hospital.

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SARCOMA OF THE FALLOPIAN TUBE

HISTORY AND LITERATURE

BY W. E. DODD, M.D., PHILADELPHIA

IN 1886 Senger (1) described a primary, small, round cell sarcoma of the fallopian tubes. Up until this time it was generally believed that malignancy of the tube did not occur. It is true that Doran (2) had described a case which Senger refers to as possibly being a carcinoma of the tube, but in Doran's article the tumor is claimed to be benign and there is no proof of malignancy. Schroeder (3), in his textbook, expresses well the current belief of the time by not mentioning tubal sarcoma at all and stating that carcinoma is never primary in the tube and only exceedingly rarely as metastasis. To Senger, therefore, belongs the credit, not only of describing the first primary sarcoma of the tube but also of describing the first primary malignant neoplasm of that structure. However, exception has been taken to Senger's claim. Coe (*American System of Gynæcology*, ii, 894), refers to the case, and doubting the correctness of Senger's diagnosis states that there is no authentic case of sarcoma of the fallopian tube on record. Nine days after Senger published his article Gottschalk (4) reported a case before a medical and scientific audience in Berlin of small spindle cell sarcoma occurring as a primary growth of the right tube. The case appeared in the literature the following month.

In May, 1889, J. E. Janvrin (5) of New York reported a primary sarcoma of the fallopian tube which he affirms is either a composite fibrosarcoma or a composite myxosarcoma.

In 1890 M. Sanger (6) reported a "primary small round cell sarcoma of the tube with decided co-operation of the epithelial elements."

Fig. 1. Side view of the specimen.

Fig. 2. View opposite the attachment of the mesosalpinx.

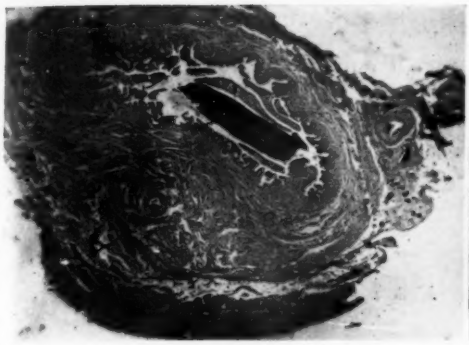

Fig. 3. Cross section of the specimen at its proximal end. The specimen varied in width from 0.7 centimeters at the proximal end to 4 centimeters at the distal.

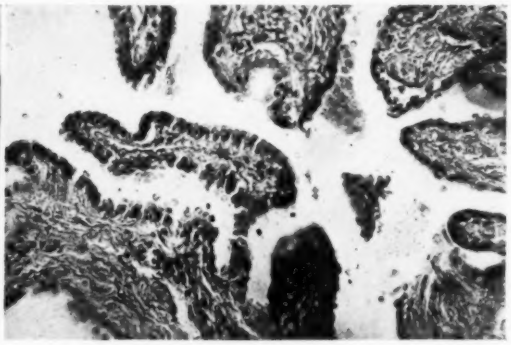

Fig. 4. A higher power of the cross section taken near proximal end showing the single layer of columnar epithelium covering the folds of mucosa.

In 1893 C. D. Jones (7) reported three cases of sarcoma (myelomata) of the fallopian tube. Two of them were considered primary while the third was considered as probably secondary. These three cases were from women who had died suddenly from internal hæmorrhage and whose clinical history was not published. The first case he considers a large round cell sarcoma. From his histological studies he believes that the endothelium of the capillaries, the smooth muscle fibers of the musculature of the tube, the smooth muscle of the wall of the arteries, and fat cells just beneath the peritoneum have all simultaneously given rise to starting places for transformation into sarcomatous tissue. In support of this view he published drawings from his histological preparations. The second case is described as a large, spindle cell sarcoma. The third case which he considers as possibly secondary is that of a melanotic sarcoma. The view advanced in discussion of this tumor, namely, that white, fibrous, connective tissue first liquefies and then out of this indifferent liquefied protoplasm the tumor cells develop *de novo*, can hardly be accepted today.

In 1897 Jacobs (8) in Belgium and von Kahlden (9) in Germany each reported a case of primary sarcoma of the tube. Jacobs gave no description of a microscopic study of his tumor but von Kahlden's might be considered as an endothelioma with giant cell formation. Von Kahlden's article is quite comprehensive. The previously mentioned writings of Senger, Gottschalk, Janvrin, and Sanger are practically copied verbatim and commented upon while the three cases reported by Jones are not accepted as authentic on the ground that they

Fig. 5. Note the tumor mass adjacent to the thinned out muscularis.

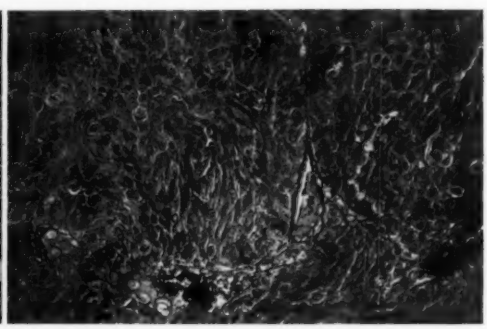

Fig. 6. Photomicrograph of a section of the tumor substance.

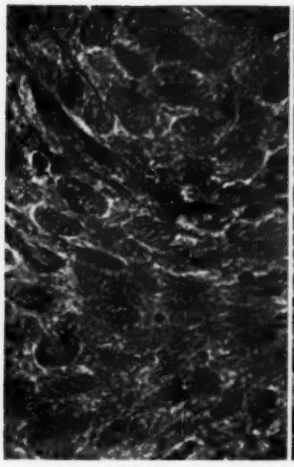

Fig. 7.

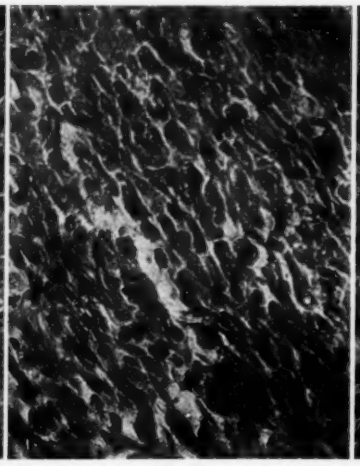

Fig. 8.

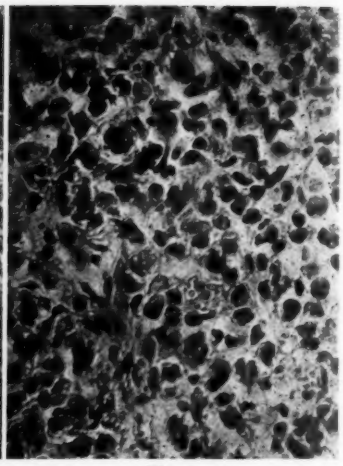

Fig. 9.

Fig. 7. A higher power photomicrograph of the tumor substance.

Fig. 8. Section made of the primary growth of Case 2. Note the spindle-shaped character of the cells.

Fig. 9. Section of a metastatic nodule which was found implanted upon the wall of the small intestine at the autopsy of Case 2, showing cells similar in character to those of the primary growth.

were uncertain preserved specimens from unknown cases. In reference to Sanger's case in which "decided co-operation of the epithelial elements" is mentioned, von Kahlden believes that the so-called "epithelial elements" are merely groups of endothelium similar to the endothelium which he observed arising from the lining of the lymph vessels.

In 1905 Jacobs (10) reported a second case of primary sarcoma of the tube which he described as a myxosarcoma and referred to Janvrin (5) as having reported a similar case.

In 1909 F. J. McCann (11) reported a primary sarcoma of the mesosalpinx consisting of round and oat-shaped cells.

In the same year A. Gosset (12) reported a primary tumor of the fallopian tube which he calls a "Perithelioma." The exact nature of this tumor does not seem clear. The author states that two interpretations may be put upon it. First, that it is a papillary carcinoma and secondly that it is a sarcoma with merely an epithelial covering. One pathologist (Waldeyer) called it a plexiform angiosarcoma while Dr. Barriell of Pasteur Institute, Paris, called it a perithelioma.

In 1911 Weinbrenner (13) reported a tumor of the tube which he also calls a primary perithelioma. In the first part of his article he calls it a typical angiosarcoma (perithelioma), but states that more careful microscopic studies show it to be a tubal carcinoma of the alveolopapillary type.

In 1912 Clara Eglington (14) published a case of primary "mesothelioma" of the tube. In her commentary she states: "It is difficult to determine the exact nature of this tumor. The individual cells look like sarcoma, while the arrangement is like carcinoma." She points out that the muellerian duct is of mesothelial origin and that the lining of the fallopian tube is a direct derivative of the mesothelium. Whether the lining epithelium of the fallopian tube is of mesothelial origin or whether it is formed by an ingrowth of the epithelium from the cloaca as mentioned by Adami (15), I feel incompetent to discuss. Eglington applies the term mesothelioma to those tumors of the fallopian tube of intermediate structure between sarcoma and carcinoma.

In 1917 Bello (16) reported a case of primary sarcoma of the tube.

Though the literature contains but few cases of primary sarcoma of the tube, the cases of secondary sarcoma of this structure re-

corded are still less in number. Perhaps this is due to the fact that secondary tumors of any given structure as a rule do not awaken the same amount of interest that primary tumors do and are therefore not reported. The following cases of secondary sarcoma are all that could be found. The reader will recall that one of the cases reported by Jones (7) was regarded as possibly a secondary growth.

In 1905, Orthmann (17) reported a "fibrosarcoma mucocellulare" which was primary in the right ovary and had extended to the right tube. In 1910 Wohasugi (18) reported a primary endothelioma of the peritoneum with metastasis to the mucosa of both tubes. In 1913 Chiari (19) reported a case of general sarcomatosis resulting from a primary, small, round cell sarcoma of the axilla. Both fallopian tubes were involved. In 1919 Buchler (20) in writing upon sarcomata of the uterine appendages which contain hyaline cylinders, the so-called "cylindromata," reported a small round cell sarcoma of the left ovary with metastasis throughout the abdomen, including implantation to both tubes.

If we summarize the cases of sarcoma of the fallopian tube thus far reported, we find that there are only twelve cases in which we can feel at all certain that they were primary growths; three are of doubtful character, and five are secondary. (No doubt the number of secondary cases are more numerous but they have not been reported.)

REPORT OF TWO ADDITIONAL CASES

CASE 1. January 24, 1921, a single woman, age 55, was admitted to the Lankenau Hospital with the following history:

For the past 6 monthes there has been a constant watery discharge from the vagina, becoming blood stained during the past 2 months. There was no pain, but an occasional "spell of indigestion." Three attacks simulated cholecystitis during the past 3 years. The bowels were constipated. There was no loss of weight to her knowledge. She feels nervous at times, had influenza in 1918, menopause in 1911, complete. The physical examination was negative with the exception of a vague resistance over the entire right side of the abdomen and slight suprapubic tenderness. There was no muscular rigidity. Pre-operative diagnosis was tubo-ovarian inflammatory disease.

Operation, January 26, 1921. Dr. John B. Deaver. The right tube was found dilated and a soft cauliflower-like growth the size of an olive protruded from the fimbriated extremity. The right tube was excised with the tumor. Ovaries, left tube, and uterus were normal. The patient made a good post-operative recovery.

The patient did well and gained weight for one year following operation, then no further record of her was obtained.

Pathological studies. Grossly the specimen consisted of a trumpet shaped body somewhat curled upon itself measuring 9.5 centimeters as it lay on the table, and 13.5 centimeters if the convolutions of the tube were followed. It varied in width from 0.7 centimeters at its proximal end to 4 centimeters at its distal end. A definite mesosalpinx was attached along its proper side. On section passing from the proximal toward the distal end, the tube grew more and more dilated and contained a sero-hæmorrhagic fluid. The longitudinal convolutions of the mucosa became less numerous and finally disappeared. The musculature of the wall thinned out as the tube became more and more dilated. About 6 centimeters from the proximal end, the sero-hæmorrhagic fluid which had filled the lumen gave way to a friable, pink, tumor mass which distended the tube still further and finally bulged from the fimbriated extremity. At the point where the tumor first began, the mucosa had already entirely disappeared and the tumor lay against the thinned out muscularis (Fig. 5).

The histological examination showed that the tumor consisted of spindle and "oat shaped" cells. There was very little intercellular connective tissue and the numerous small blood vessels had scarcely more than an endothelial lining. From the microscopic appearance of the cells, from their great number, their densely stained nuclei with frequent mitotic figures, from their "combing"; there is little doubt that it was a spindle cell sarcoma (Figs. 6 and 7).

The exact point of origin cannot be positively established but it arose probably either from the submucous connective tissue or from connective tissue in the adventitia of a blood vessel.

CASE 2. February 20, 1920, a married woman, age 60, was admitted to the Lankenau Hospital. She had felt weak and in "ill health" for the past year. Eight days before admission to hospital she began to have a bloody discharge from the vagina. The menopause took place 8 years previously. She had had two children. Vaginal examination revealed a vague mass on either side of the uterus. At operation both tubes were found dark in color and distended. Tubes, ovaries, and appendix were removed.

Pathological studies. The right tube was doubled upon itself and held by adhesions. It measured 11 centimeters in length and from 3 to 5 centimeters in width. The contents were sero-hæmorrhagic fluid under tension. The serosa was dark blue in color, the mucosa was smoothed out, and the wall measured 0.5 centimeters in thickness. Microscopical examination revealed a spindle cell sarcoma in the wall

(Fig. 8). There were no pathological changes in the ovary, left tube, and appendix.

On March 12, 1922, the patient was re-admitted to the hospital. She had lost considerable weight, was anæmic and physical examination revealed a large, hard, irregular, nodular, tumor mass occupying the lower part of the abdomen. Death occurred on March 17, and at autopsy the lungs were found studded with tumor nodules. The mass in the abdomen proved to be a tumor which had been diffusely scattered throughout the abdominal cavity. At the time of operation no pathology other than that described in the fallopian tube was found, so the conclusion is drawn that the right tube was the site of the primary tumor. Microscopically this tumor consisted chiefly of spindle shaped cells arranged in the typical "combed" fashion, quite vascular and with abundant mitotic figures. Sections from the recurrent growth obtained at autopsy from the abdominal cavity and from the lungs showed that the cells were of similar character to those found in the primary growth with the exception that sections were more highly cellular and greater numbers of cells showed degenerative changes.

SUMMARY

A review of the literature on primary sarcoma of the tube, reveals 12 authentic cases.

Since 1900, there have been 1,871 salpingectomies performed at the Lankenau Hospital, most of which have been bilateral. All of these specimens have been studied both grossly and microscopically and these are the only two cases of sarcoma in our records. An interesting point is the fact that both of these patients in whom the tumor occurred were past the menopause, one being 55 years and the other 60 years of age.

I wish to express deep appreciation and thanks to Dr. John B. Deaver and to Dr. Stanley P. Reimann for permitting me to study and report these cases.

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THE MOTOR SIGNIFICANCE OF HÆMANGIOMA

With the Report of a Case of Plexiform Telangiectasis of the Sciatic Nerve and its Branches[1]

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As an orthopedic or neurological problem hæmangiomata are quite uncommon. Thus the records are few and scattered. The guises in which angiomata come are varied, the diagnosis sometimes difficult, the outcome occasionally disastrous, and the therapy greatly befogged. Therefore, a careful study of the whole problem from the standpoint of the surgeon has been undertaken.

DEFINITION

Hæmangiomata are neoplastic overgrowths of blood vascular tissues. Varicosities, aneurisms and redundant granulation tissue are therefore excluded. According to the best authority (33, 40, 20, 10, 29) angiomata are made up of endothelial lined spaces of various sizes, the outer portion of the vessel walls generally being absent. It would seem that there is an endothelial proliferation of the intima, some segments of the vascular system of certain individuals presenting endothelial out-buddings from which new blood spaces originate. In certain specimens (29) there are seen lines of endothelial cells between which the blood corpuscles are pushing their way, thus indicating an extension of the angioma. According to the size of the spaces, the growths are classified clinically and pathologically as (1) capillary and (2) cavernous. Besides these there is the peculiar form of (3) plexiform or racemose angioma which is made up of true vessels, but in which there reside neoplastic characteristics.

ETIOLOGY

Hæmangiomata have certain peculiarities which are worthy of note. All the evidence leads to the belief that these tumors are congenital. It is true that the cavernous and racemose types usually declare themselves in the second or third decades, but this is no argument against the presence of the potential structures at birth. The appearance of an unsuspected tumor, or the development of a recognized angioma is occasionally noted at puberty, sometimes subsequent to trauma, but more frequently without associated cause. Additional evidence of their congenital origin is found in the fact that a considerable number of cases have been reported, in which the cavernous form has started from a pre-existing birth mark. This is well illustrated by the patient of Konjentzny (18).

Case 1. A man, age 26 years, had a birth mark in the lower half of the left axilla. This remained stationary until one and one-half years ago when it gradually extended. Now, as a cavernous angioma, it occupies the breast, neck, back, and entire left arm.

Furthermore, Fitzwilliams (12) in a study of 645 patients found that in 83.2 per cent the hæmangiomata were observed at birth, that in an additional 12.8 per cent they appeared within the first 3 years of life.

Patton (28) found that in 108 cases of hæmangiomata, 16 per cent gave a history of a similar condition occurring in the family. Babbington (2) described a familial form of the capillary, or telangiectatic type occurring on the mucosa of the nasal septum and characterized by profuse hæmorrhage. Steiner (35) in reviewing all reported instances, observed that this familial type may occur in as many as five generations, and may be transmitted and that it appears equally in either sex.

OCCURRENCE

Sex is a determining factor in the occurrence of the ordinary angiomata. In a series

[1] From the Orthopedic Department, Children's Hospital, Los Angeles, California.

made up of 1,674 cases taken from British and German authors (3, 5, 12, 15, 19), the series in whole or in any part indicates a two-fold incidence in girls. The exact percentage was 66.2 per cent in girls and 33.7 per cent in boys.

All authors who have made careful observations on this point note a regional predisposition of the tumors. The following table will give a clear idea of the distribution. It is

DISTRIBUTION OF ANGIOMATA

Author	Face and Neck		Trunk		Extremities					
					Upper		Lower		Total	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Kramer (19).....	129	57.6	63	28.1					31	14.2
Gessler (15).....	174	79.	24	11.					21	9.8
Fitzwilliams (12)..	343	49.	203	29	84	12	63	9	147	21.
Total.....	646	56.8	290	24.9					199	17.5

probable that this distribution led Unna (39) to think of abnormal pressure during fetal life as being the genetic factor in their formation. This regional arrangement is a reason why angiomata so seldom appear in orthopedic clinics. Fitzwilliams (12) also observed that practically one-half of all these tumors appear on the left side and that only 9 per cent are symmetrical.

It has been found by Fitzwilliams (12) that only 8.6 per cent of angiomata are purely subcutaneous tumors and that about 35 per cent were beginning to pass from a purely cutaneous type to a deeper distribution. He likewise observed that the fascial sheaths of muscles present distinct barriers to their advance.

Another factor in their incidence noted by Cushing (7), Fitzwilliams (12) and others, is the frequency with which the angioma coincides with the distribution of the peripheral nerves. The case which is here reported beautifully illustrates this. These observations gave rise to the neurogenic theory of their origin.

ANGIOMA OF MUSCLES AND FASCIA

The symptomatology of these tumors is dependent on both the topography and character of growth. In general, the capillary type, if not apparent on the surface, is very likely to be the most difficult to diagnose. Murphy's (23) patient, herewith given, may be taken as an illustration of this condition, though representing it in a very advanced stage.

CASE 2. In a female, 17 years of age, dilated veins were noted in the left lower leg when the patient was 2 months old. These gradually increased in size. Dilatation of the veins was more apparent when walking and pain of a dull aching character was present only when the leg was dependent. Murphy mentioned nothing except the local condition. In the foot there was destruction of all the parts except the skin and bones. The vascular disturbance evidently extended as far as the knee and involved the periosteum.

One could wish for a more detailed description of this case, giving more of the muscular condition of the leg and of the exact pathology; but it gives, however, a good idea of the extent to which these growths can go. The case which is recorded under the heading of peripheral nerves also illustrates, in a measure, this same condition.

Contrast with this the average cavernous angioma of the extremity as illustrated by the patient of Ashhurst (1).

CASE 3. A girl, 10 years of age, complains of disability of the right arm which has existed from infancy but which has become progressively worse in the last few months. The fingers of the hand are numb and weak and there is a dull pain which is relieved by bandaging.

Physical examination shows that the whole right pectoral region has a bluish tinge. The entire arm is somewhat livid and there is œdema of the hand and fingers. There is a cyst on the extensor surface of the wrist, and there is slight atrophy of the forearm; slight enlargement of the upper arm, and a 2 centimeter shortening of the entire arm. No enlarged superficial veins were found.

Many of the cases of this type show very distinct enlargement during dependency. In some, ulcerations appear which may or may not result in very severe hæmorrhage, as in a case which was reported by Norris (25). X-ray examination may reveal the presence of phleboliths, or these may be palpable. Under certain conditions there is a distinct pulsation of the tumor and even a bruit can sometimes be heard. Aspiration will verify the diagnosis. In contrast to this generalized involvement of the extremity, a single muscle is sometimes concerned, as the gluteus maximus described by Summers (36).

The racemose type is very rare, especially on the extremities. Schuck, quoted by Ewing (10), found only 3 on the extremities to 84 on the head. Péan (27) gives a classical illustration.

CASE 4. A male, aged 65 years, gave a negative family and past history. Twelve years ago the palmar surface of the first phalanx of the right thumb became unnaturally hard. An ulcer formed which healed slowly. Two years ago he noted that the vessels on the dorsum of the thumb were dilated and sinuous and exhibited pulsations as high as the wrist. The growth has been increasing but there has been no pain.

The entire thumb and thenar eminence were deformed by vascular cords varying from the size of a crow's quill to that of a goose quill. The smaller are the more numerous and more abundant at the tip of the thumb where the skin is much thinned and of a violaceous hue. The larger resemble varices and are continuous with the subcutaneous veins of the wrist. On the palmar surface, the skin is almost mortified, being thin, blackish and adherent to the phalanx. On palpation nearly all the vessels are soft and compressible. Throughout its course the radial artery is uniformly dilated to about three times its normal size and, at the level of the radial groove is about the size of the axillary artery. No nodosities.

This condition was first treated by crushing the artery for 36 hours in hæmostats. The result was a failure. Later the dilatation became larger, an ulcer formed on the end of the thumb and nearly destroyed it. Under anæsthesia and tourniquet, intra-arterial injections of perchloride of iron were made which formed a clot. The whole erectile mass was then excised and the wound allowed to cicatrize. Dressings were extremely painful for a number of days.

Here are exhibited all the characteristics and some of the complications of this type. But sometimes the features are obscure as shown by the following report by Dr. George H. Gay (13), a former surgeon to the Boston City Hospital.

CASE 5. After a diagnostic shopping tour of Europe and this country, a woman consulted him for a tumor in the flexure of the right elbow which appeared after hard exercise and which had been repeatedly diagnosed as a lipoma. The tumor was soft, elastic, movable, painless, and showed no change in size. At operation he removed a tortuous mass of veins.

ANGIOMA OF BONES

Angioma of the bones are rare. Hitzrot (17) collecting all possible cases, found only 26 or 28 cases on record. Since his time, only two new cases have been found, one by Cushing (8) and one by Ewing (10). Summarizing these, it would seem that 14, or possibly 16, belong to the skull, 8 to the extremities and 6 to the vertebræ. Of these, only two are known to have had X-ray studies.

Hitzrot (17) classified angioma of the bone into three groups: (1) solitary angioma, (2) multiple angioma with similar lesion in another organ, and (3) multiple primary hæmangio-endothelioma. Practically all belong to the first group. As to the point of recurrence, Hitzrot believes them to originate most frequently near centers of growth as the epiphyseal lines and cranial sutures.

Clinically the tumors are hard to diagnose and both Cushing (8) and Hitzrot (17) missed the diagnosis even with an X-ray examination and operation. Hitzrot states: "As a rule, the tumor grows slowly, produces symptoms especially in the vertebræ and skull by pressure upon the surrounding structures, does not pulsate except in rare cases and then only when it has broken through the bony shell." The two cases which were X-rayed are from different types of bone and are not at all similar in appearance. Both, however, suggest cysts, one showing the formation of new bone and one showing none. Therefore, from this standpoint little may be said. At operation Péan (27) states that one may find irregular cavities, or several cavities fused into one, that sometimes there is an organized clot and sometimes free bleeding. Hitzrot's case would justify these assertions. Pathologically, Hitzrot urges that sections from several areas be made as, in his case, the diagnosis might easily have been missed as the sections varied so greatly.

It would seem from Ewing's (10) description of a case of angioma of the vertebræ that it is chiefly an involvement of the body and that it collapses much as a metastatic carcinoma of the spine might do. Hence, in a case suggesting a metastatic tumor of the spine, but in which one could not find a primary source, angioma of the vertebræ should certainly be considered, and all possible diagnostic methods used which might lead to its recognition.

ANGIOMA OF JOINTS

Occasionally the angioma affects the joints, interfering with their proper function. Osgood (26) has recently published an illustration of such a condition in the knee joint, and Haas (16) reviewing the German literature, found 9 instances of the same condition. All "closely resemble an internal derangement of the joint or a foreign body." In Osgood's case the pre-operative diagnoses were as follows: (1) lipoma arborescens, (2) a tumor, (3) tuberculous pannus, (4) solitary gumma. The only possible diagnostic test not used in this case was an observation of the effect of elevation on the tumor contents and joint action. Even this test might be negative if sufficient reaction had occurred within the joint. In one of Haas's patients an excision of the tumor was practised, but there was a recurrence which destroyed cartilage and bone to a marked degree and because of this the joint was excised.

ANGIOMA OF NERVOUS SYSTEM

Angioma of the nervous system may cause symptoms which will bring the patient to the orthopedic rather than the neurological surgeon. This is well illustrated by a patient who came under observation in the Orthopedic Clinic at the Children's Hospital of Los Angeles. So far as can be ascertained, this is one of the few cases in the literature in which it can be definitely said that the tumor and its symptoms chiefly concern the peripheral nerves.

CASE 6. W. H. W., a male, aged 10 years, was admitted to the hospital in September, 1922. His chief complaint was that he "walked lame." The child was normal at birth. At 10 months a lump was noted in the lower part of the right leg. Later three other lumps were observed. When he was about 4½ years old these masses were seen to be increasing in size and spontaneous pain appeared which was not relieved by position. This was followed by a flexion deformity of the knee which resulted in a definite limp. X-rays were negative. A specimen removed for diagnosis in 1918 was thought to be a varix by the surgeon. The leg was placed in traction and straightened but the deformity recurred immediately when traction was removed. In spite of negative Wassermanns he was placed on anti-luetic treatment without result. The pain has not been continuous but the deformity and limp have persisted to the present time. Recent attempts to straighten the leg forcibly induced severe pain. The child is more comfortable when holding the leg in the manner illustrated in Figure 1. He has been excluded from school because of pain and deformity.

The past history was unimportant.

The family history was negative so far as similar condition is concerned.

The mother has a speech defect.

Physical examination shows an undernourished, nervous child who seems to be somewhat below par mentally. The general examination is negative except for absence of tonsils and some enlarged suboccipital glands on the left side.

Stance. The patient stands with round shoulders, left list and slight right dorsal, left lumbar, functional scoliosis. The right hip and knee are usually flexed and externally rotated. The right foot is held in equinovalgus. The right leg is supported at the knee by the hand (Fig. 1).

Gait. The patient has a hitching gait and fails to place the weight squarely on the right foot (Fig. 2).

Surface anatomy. No marked changes are observable in the surface contour of the right thigh. The right knee is flexed to about 90 degrees. The periarticular tissues are atrophic, the patella is small and there is no evidence of joint effusion. The contour of right leg is rather lumpy (Fig. 1). There is a scar over the upper end of the tibia about 7 centimeters long and medial to this is a distinct lump; about 9 centimeters further down the tibia is another small lump. Over the head of the fibula there are several small, bluish areas averaging less than 0.5 centimeter in diameter. These become distinctly swollen when the limb is dependent. The lower portion of the belly of the gastrocnemius is enlarged and there is a distinct tumor about 4 centimeters in diameter at the upper end of the tendo achillis. There is a distinct decrease in the development of the right foot but no changes of further note.

Palpation. The thigh is negative except that in the course of the sciatic nerve one gains the impression of several deep seated nodules which are distinctly tender. This is especially true at the upper end of the popliteal space where it was thought a definite mass could be felt. It is apparently about 2 centimeters in diameter, firm, smooth, nonadherent, and pressure causes pain and spasm of the muscles around the knee. In the course of the peroneal nerve several small, firm, tender masses can be palpated but no pulsation can be determined in this area. In the region of the scar there is a distinct lump about 2 centimeters in diameter which is smooth, not adherent to the skin, and tender. The mass on the medial side and lower end of the tibia has the same general characteristics. The mass at the lower end of the gastrocnemius gives one the impression of being located within or beneath this muscle. No definite form can be made out, and it would seem to be adherent to some of the deeper structures. It is firm and distinctly tender. The

mass in the region of the tendo achillis is about 4 centimeters in diameter, very dense, elastic, and somewhat movable but is not concerned with the tendo achillis. These tumors are all present in either dependency or recumbency and no change in their character can be determined with a change in position.

Joint motions. The hip is actively and passively movable throughout its normal range.

The knee cannot be flexed to within 20 degrees of normal. This block seems to be due to pressure within the popliteal space causing pain. Extension lacks 75 degrees of being complete and is stopped by muscle spasm.

Foot. Actively and passively the foot is capable of a full range of motion but the reaction is neither prompt, active, forceful, nor sustained.

Muscle examination. This is unsatisfactory because of the child being inattentive, but it would seem that all the muscles below the knee are of less than normal rating. The peroneals seem to be stronger than the tibials.

Neurological examination. Reflexes are normal in both legs, and no pathological reflexes can be obtained. Sensation seems to be interfered with to a slight extent for light touch from the knee down. Pain, temperature, and deep sensation are normal. There is slight but distinct anisothermia, the affected leg being the cooler.

Pigmentation and skin. The right leg is distinctly more pigmented than the left and shows a peculiar mottling. The hair follicles seem to be white surrounded by a pigmented zone, the pigmented zones in turn being separated by white lines. The skin of this side seems rougher than on the left.

Blood-vascular system. Beside the venous enlargements noted above, the posterior tibial pulse on the right seems to be smaller than on the left. Blood pressure in recumbency, left leg 134–90; right leg, 118–90.

Mensuration. There is 5 centimeters of atrophy of the right thigh, the right leg is 2.5 centimeters larger than the left, 1 centimeter of shortening of the right tibia, the right foot is 3 centimeters shorter than its fellow and 1.2 centimeters narrower.

Glands. A few small non-adherent glands can be palpated in Scarpa's triangle.

Laboratory tests. Wassermann tests of child and parents were repeatedly negative. Tuberculin test was negative. Blood picture showed nothing remarkable.

Diagnosis (tentative). Multiple neuromata of the sciatic nerve and its branches. Exploratory operation advised.

Operation. September, 1922. The sciatic nerve was exposed from the sciatic notch to the upper limit of the popliteal space. The nerve sheath was found to be quite vascular. On incising the sheath the external and internal popliteal nerves were found to be separated as high as the sciatic notch. The external popliteal throughout the operative field was found to be normal in size and appearance. The internal popliteal was enlarged to five or six times the normal size and presented a mottled, brownish blue appearance. It felt finely granular and some parts seemed larger than others but no distinct nodules could be felt. The nerve was incised between two of the fasciculi over one of the firmer areas and the same brownish blue appearance remained as far as the nerve was explored. No bleeding was encountered in this procedure. No masses could be definitely localized and it was felt that we had an irremovable tumor condition of the internal popliteal nerve. The wound was closed and the child returned to the ward.

Postoperative consideration. It was felt that because of the existing deformity, the pain and the lack of importance of the internal popliteal in the thigh an amputation above the knee would be desirable together with the removal of the internal popliteal as high as the sciatic notch, and this was advised.

Operation. October, 1922. The old wound throughout the length of the thigh was excised and the internal popliteal was divided at the highest possible level, the proximal end tied and injected with 95 per cent alcohol. The ends of the incision were then carried as a racquet around the knee and the bone was divided above the epiphyseal cartilage and treated aperiosteally. On the external portion of the racquet a bluish, spongy mass was encountered which bled freely. The external popliteal could not be found at the level of the amputation and because of the child's condition a prolonged search for the same was not instituted. The distal end of the internal popliteal nerve was removed from its sheath and the wound closed.

Subsequent course. There was again a superficial infection owing to the child's disturbing the dressings. A plaster pylon was applied. At the present time he walks quite well with the apparatus. Two small superficial areas in the scar have been very slow in healing. The pain has disappeared from the leg and the child is much more presentable than before operation and he has been re-admitted to the public schools.

Pathological report. Gross. The external appearance of the amputated member has been sufficiently described. The skin and subcutaneous fat on the mesial side of the leg were easily removed and showed nothing pathological. On the lateral side of the leg the fat and the deep fascia were separated only with difficulty, especially in the upper third of the leg, owing to an infiltration by numerous and irregularly scattered angiomatous areas about 0.5 centimeter in diameter. Just lateral to the crest of the tibia and at about the junction of the upper and middle thirds there was a pyramidal mass of angiomatous tissue which was adherent to the sheath of the tibialis anticus but which was easily separated from the subcutaneous tissues. The surface of the gastrocnemius was very irregular and was mottled with angiomatous and fatty areas. On section the gastrocnemius was seen to be largely replaced by fatty and fibrous tissue and has a dirty yellow color.

The soleus was quite adherent to the gastrocnemius and showed the presence of many angiomatous areas which extended distally into the tendinous portion of the muscle. The smaller and more discrete angiomatous areas in the muscle, as well as in the nerve and fascia, reminded one of the moss in the so-called moss agate. The other muscles were apparently normal. The sciatic nerve has already been described under the operation and its condition is well shown by Figure 3. The stump of the internal popliteal nerve was made out quite easily as a very much enlarged mass of fasciculi which are surrounded and to a certain extent replaced by angioma. The external popliteal nerve was not found at this level, apparently being lost in the spongy mass of tissue lying above and behind the head of the fibula. The various nerve trunks were isolated in the distal portion of the leg and traced upward and the following features were observed: The nervus suralis existed as a rough, stringy mass of angiomatous tissue extending from the point of its emergence below the belly of the gastrocnemius to the heel. Its average diameter is about 0.5 centimeter. The nervus peronæus superficialis was about 0.3 centimeter in diameter and was quite smooth and contained numerous angioma and at the proximal end it was traced into the large angiomatous mass located around the head of the fibula. Its sheath in the more distal portions was entirely made up of angioma. The nervus peronæus profundus was normal in appearance up to a point where it began to wind around the head of the fibula, where it enlarged, became brownish blue in color, was firmer in consistency and passed through the mass of angiomatous tissue already mentioned. The internal popliteal nerve divided just below the level of amputation. The branches to the gastrocnemius were very much enlarged and angiomatous in character. The main trunk continuing as the nervus tibialis was very much enlarged and the angiomatous condition extended to the point where the nerve passed to the dorsal surface of the posterior tibial muscle distal to which point it apparently became normal.

Microscopic sections of the gastrocnemius muscle showed only an occasional striated muscle fiber and most of the muscle fibers presented brown atrophy. There was considerable replacement of the muscle tissue by fat and fibrous tissue. Between the muscle fibers were numerous large channels lined by a single layer of endothelial cells; some of these spaces contained red blood cells. The fibrous tissue also contained numerous thin-walled blood vessels and here and there were collections of round cells. Sections of the nerve trunks showed large spaces lined by a single layer of endothelial cells resting on thin septa of fibrous and elastic tissue. Many of these channels were in the sheaths of the nerves, but the external popliteal nerve showed the sheath invaded and the nerve fibers pushed aside, the blood vessels occupying practically the entire sheath, and in some instances the smaller fasciculi contained a number of thin-walled blood vessels; and in some instances a fasciculus was isolated by blood spaces. There was no hyperplasia of the endothelial cells. The whole picture was one of a new-growth of thin-walled blood vessels which had invaded the nerves and muscle in their paths, and in this sense it was malignant.

The remarkable clinical features of the present case are (1) spontaneous pain, (2) tender masses in the course of the sciatic nerve and its branches, (3) deformity due to muscle spasm, and (4) muscular weakness due either to destruction of muscle or interference with the nerve supply or both. All these symptoms pointed to nerve involvement and on them the diagnosis of neuromata was made.

Pain is not an unusual symptom of angiomata of the extremities. It would appear to be of two kinds: (1) the pain of congestion, (2) spontaneous pain. Both kinds were found in this case. Spontaneous pain bespeaks nerve irritation. Monod (22) in 1879 described a case of angioma douleureux in which there was spontaneous pain and local tenderness in a mass above the right olecranon which appeared subsequent to trauma. He attributes priority in the description of this condition to Schuh (32) and also states that Trélat (37) described similar conditions. Tubby (38) under the same name described the case of a woman who had a series of angiomata appearing in both arms and finally in the leg. In the latter, at least, spontaneous pain was one of the presenting symptoms. From their pathological description and discussions, it would seem that nerve involvement was incidental, a few nerve fibers running through the tumor or its capsule. Fabian (11) in a rather confused[1] and brief report, mentions a cavernous angioma of the coracobrachialis muscle which suddenly became troublesome, the arm being heavy with radiating pains throughout its entire length followed by weakness and complete disability. At operation the musculocutaneous nerve was found to run through the middle of the growth. He had made a diagnosis of neurofibromata on the basis of a small, firm, sensitive lump. One can only wish that a more complete symptomatic and

[1] Fabian is not clear in his description as to the side on which the nerve involvement existed.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1. Shows favorite position that patient assumed when standing, and also shows some of the lumps in the leg.

Fig. 2. Shows position taken by child as he would take off in making a step, also illustrates some of the lumps on the leg and nearly the full extension of the knee. The right leg also exhibits a deeper pigmentation of the skin.

Fig. 3. Specimens of internal popliteal nerve and cross sections removed from corresponding end of segments. In the lower left hand section note the perifascicular arrangement of the angioma. The split in the lower section represents the site of the exploratory operation. The right hand segment illustrates very well the manner in which the angioma was extending along the nerve, and is very similar to the manner in which it also appeared in tendon sheaths. The cross sections show the irregular and extensive manner in which the nerve was involved.

pathological report of this case could be found. Sommer (34) gives a somewhat ambiguous[1] description of a patient who had an angioma of the posterior tibial nerve. A girl, aged 4, developed a soft spongy tumor behind the left internal malleolus. About one year later the tumor became exceedingly painful, especially on pressure. Shortly after the onset of the pain, the tumor was operated upon and was shown to be an angioma of the posterior tibial nerve. Pathological examination revealed the fact that the larger nerve bundles were distributed over the surface of the tumor. Each of these bundles was subdivided into fasciculi and in the periphery of these fasciculi were found capillaries containing from three to five corpuscles and he suggests that an individual fasciculus seems to offer the picture of an early stage of the entire nerve. He also abstracts a report of a case of Sato (31) in which the patient exhibits the same characteristics of delayed pain and a broken up nerve. A brief report of this case appears in a subsequent paragraph of this paper.

Here then are at least four instances of angiomata of the larger peripheral nerves in two of which we are certain that the fasciculi had been invaded by the new growth of blood vessels. In all of them the tumor existed for a longer or shorter period as a painless object, then suddenly it became severely painful. No other reports of angiomata of the peripheral nerve were found in the literature and, while it is unwise to draw absolute conclusions from so small a number, it would appear that the sudden onset of pain radiating from a hitherto painless tumor in the soft parts of the body wall or extremities should suggest a hæman-

[1] The same term is used throughout his description to specify all divisions of the nerves so that we cannot be sure of the exact point of invasion by the tumor.

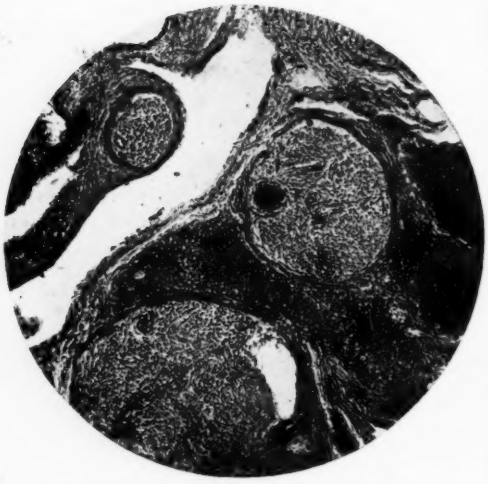

Fig. 4. Section of internal popliteal nerve showing (1) large spaces lined by endothelial cells, (2) small blood vessels inside nerve sheaths.

gioma invading a peripheral nerve as one of the possibilities.

Tenderness, of course, is common in many conditions but its appearance along the course of major nerves is very suggestive of an irritated condition of that nerve.

A case of Cruveilhier (6) is the only one that has been found in which there was a contracture or spastic deformity in the part affected by the tumor. There is no history save that she was hemiplegic and whether or not the contracture was due to the cerebral or peripheral lesion cannot be said. Muscle spasm is sometimes significant of a bone or joint lesion but these were definitely ruled out in the patient whose history is here presented.

Muscular weakness is frequently mentioned by various writers. It may be due to a destruction of muscle as the gastrocnemius of the present case or it may be due to a destructive lesion of the nerve which is thought to account for the general weakness which existed below the knee aside from the gastrocnemius. Sato (31) describes a patient, male, age 64 years, who for fourteen years had observed a hard painless tumor on the medial side of his arm. Eight months before Sato observed him, he began to have lancinating pains radiating into the forearm which gradually extended in the course of three months so that the thumb, index, and middle fingers were affected. At the same time the tumor became painful on pressure, the pain passing downward, the arm became very weak and there was some paræsthesia and hyperæsthesia in the region supplied by the median and ulnar (?) nerves.[1] The median nerve was found to run through the growth which broke the nerve up badly. The cavernous spaces contained thrombi and phleboliths. A more exact pathological report is not given by Sommer who abstracted Sato's report. The angioma reported by Sommer was at such a low level that only the intrinsic muscles of the foot could possibly be affected and any slight weakness of these would be very difficult to determine.

The question naturally arises as to whether pre-operatively a more exact diagnosis could have been made in this instance. Monod (22) calls attention to a deeper pigmentation of the skin over a subcutaneous angioma, which was present in the case that is here presented. Again the small bluish out-pouching over the fibular head might have been suggestive, as might also the exploratory diagnosis of varix by an earlier operator. The latter aid was not found pre-operatively.

One wonders if the shortening of the leg and smallness of the foot are results of nervous or vascular disturbances—one or both. Ashhurst's (1) and Lichenstein's (21) patients had shortening while Gerster's (14) had an increased length of the foot. What caused the differences in systolic and pulse pressure, and what is their relationship to the diagnosis? Without other cases for comparison no generalizations can be made as to the diagnostic value of these points.

Hæmangiomata of the spinal cord or its envelopes are exceedingly rare. Cobb (4) in a most thorough review of the literature found but 7 and added 1 more. A better summary of the reported cases can not be found than the first paragraphs of Cobb's discussion of his case:

[1] The original report was not obtained but is abstracted by Sommer. In this abstract, at one time the hyperæsthesia is stated to occupy the distribution of the ulnar nerve and at another time it is stated as being in the radial distribution. The ulnar distribution seems to the writer to be the more probable localization.

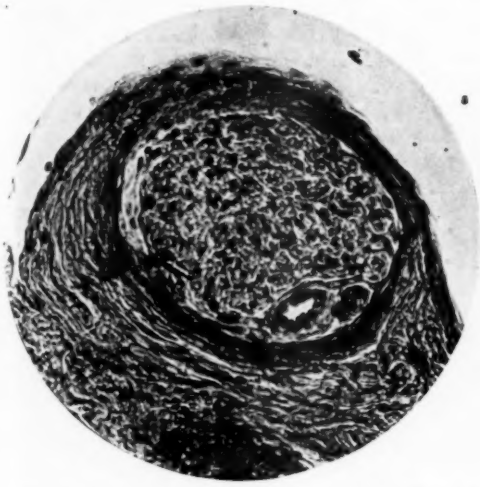

Fig. 5. Section of internal popliteal nerve showing newly formed blood vessel inside of nerve sheath.

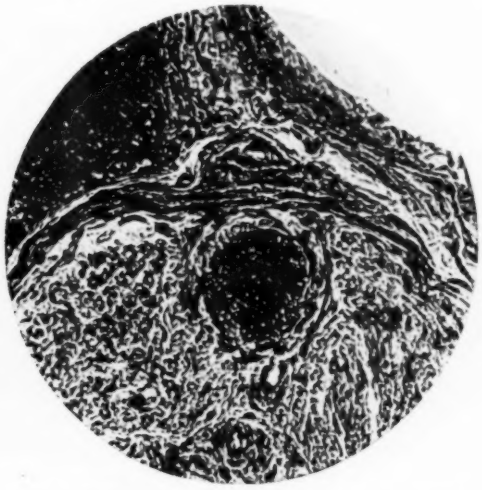

Fig. 6. Section of internal popliteal nerve showing newly formed vessels within the nerve sheaths.

"This series of seven cases, though small, permits of a comparison which brings out some points of interest. The onset is usually slow, the paralysis not reaching its maximum for days or even months. In two instances, weakness of the feet was the first symptom, preceding paralysis of the leg by 2 weeks and by 6 months; in another, weakness of the right hand preceded the paralysis by 2 days. In three of the cases pain came on suddenly but was not followed by paralysis for 5 days in one, 2 weeks in another, and 5 months in the third. A history of recurrent attacks after partial recovery appeared twice, while in four of the cases a single attack seemed sufficient to cause a permanent paralysis. Four of the histories note an onset with flaccid paralysis, described as "weakness," the spastic symptoms not coming on for a considerable time—2 months, 6 months, and 14 years in three of these, while in the fourth the patient died in the flaccid state. In short, the symptomatology appears to be that of hæmorrhage into the spinal cord or canal, generally recurrent if the patient survives the first paralysis. Death in two of the cases was due to respiratory failure, in two to decubitus, and in two others to operation, while one has no clinical history and the other patient is alive. . . .

"Pathologically it is striking that in all of the cases the tumor involved the pia; in two the dura was also involved, and in two the cord substance was invaded. . . . The tendency seems, therefore, to be toward a low position. . . .

"One of the most interesting features of the case here reported is the occurrence of nævi on the skin in the same metamere as the angioma of the cord; that is to say, the membranes of the spinal cord in the vicinity of the tumor are supplied by the same nerve roots as the skin on which the nævi were found. In none of the other cases was a similar observation made, unless the lipomata and deep angiomata in Berenbruch's case may be so considered, but nævi may have been present and escaped notice, or may have been noticed and not thought worthy of record."

From the orthopedic standpoint, in Cobb's case it is interesting to note that the presumptive diagnosis on admission was anterior poliomyelitis. In his case the angioma was evidently of the racemose type. This was also found in two other cases and cavernous angioma was noted in one case. In the remaininging instances the exact character of the tumor was not mentioned.

Among the tumors of the brain we find some 21 recorded instances of racemose angioma of

the brain, all of which have been reviewed by Deist (9) who finds no clear-cut way of separating them from other tumors giving rise to jacksonian attacks.

Cushing (8) has called attention to a very interesting angiomatous condition of the brain which is worthy of note. The symptom complex which he describes is this: a child, who has a nævus involving some portion of the skin supplied by the fifth cranial nerve, associated with hypertrophy of the deeper tissues of the affected area, develops hemiplegic symptoms and epileptiform attacks without apparent cause. At times there is increased irritability and decreased mentality. Besides these features which would ordinarily be noted by the parents, Cushing finds in all his cases and in 3 other cases which have been recorded, that the eye of the affected side shows a wider palpebral fissure and a bluish sclera which gives the eye a "china doll" appearance. There is no change in the fundus of the affected eye. In the two cases where the dura was examined, one at operation and one at autopsy, there was found a very definite thickening and increased vascularity of the dura over the motor and adjacent areas. He ligated the external carotid in one case with excellent results.

PROGNOSIS

As to prognosis, it would seem that the majority of vascular tumors remain symptomless throughout life. Occasionally the hæmangioma becomes definitely malignant, metastasizing to all parts of the body; and there is a definite and considerable number which exhibit growth by extension, the limit of whose advance no man can estimate. Attention has been drawn to a few of these. Considering their usual insignificance at birth, the uncertainty of their development, the possible magnitude of their growth, the uncertainty of arresting their progress, and the severity of the developed disability, it would seem wise to formulate a more exact procedure for their disposition. All angiomata, it may be fairly said, are potentially benignly malignant, usually sparing life, but always marring and sometimes disabling their victims. It appears that the prognosis under treatment is dependent somewhat upon the age at which treatment is begun; the younger the child, the more favorable the prognosis (30).

TREATMENT

A multitude of methods have been instituted in the treatment of this condition.

As to the superficial type, it would seem that the port wine stains are very resistant to treatment (30) while the elevated growths yield satisfactory results with freezing or radium (30, 24), and if used before extension has developed the treatment may be considered, in a measure, prophylactic. When we consider the case here recorded we wonder if deep radiation in infancy might not have averted the amputation. If ever this condition confronts us again at a time when it has not become so advanced, we will certainly advise these measures.

The cavernous type has received, in the main, two forms of treatment: coagulation and operation. The former is based on the belief that by one of several means the blood within the tumor may be coagulated and will eventually organize, causing scar tissue. The coagulants used are boiling water, astringent chemicals such as ferric chloride, and electricity. Such procedures are open to serious objections. Péan, in the admirable discussion already referred to, warns his students that injections of these types have been followed by severe local inflammation, gangrene, multiple emboli, and death. He applied a tourniquet around the arm and then injected the vessels. He at once cut down on them and excised the mass, his object being to preserve the form of the vascular mass so that its parts could be more easily recognized. In the operative field many procedures have been used: subcutaneous ligation, open ligation, and excision. The first two are certainly only temporary expedients the pathology of the condition not being taken into account. While the ligation may arrest the current, it fails to stop neoplastic tendencies. It is imperative, therefore, that if a cure is to be effected, excision of the whole mass should be undertaken. In the cases where a single muscle or group of muscles is involved, it would be wise to consider the orthopedic

significance and possibilities prior to the original operation. Certainly in the lower extremities where the mass is causing severe symptoms or is greatly incapacitating, an amputation might well be considered. We have no guides as to postoperative treatment but judging from experience in other fields, we might employ some form of radiation to destroy any remaining elements.

In the racemose type, ligation, but preferably excision would be the method of choice. Cushing, in the case reported by Cobb, did not consider either of these methods feasible, probably because of the extent of the growth, or the condition of the patient.

CONCLUSIONS

1. Angioma of the most trivial sort should be regarded much more seriously than at present.

2. All angiomata should be regarded as potentially malignant by extension.

3. In an obscure condition the presence of superficial nævi in either the same metamere or on other parts of the body would be suggestive of an angiomatous cause.

4. A hitherto painless tumor of the soft parts of the body wall or extremities which suddenly becomes painful, should suggest an angioma invading the peripheral nerves as one of the possibilities.

5. Destruction of an angioma by some rational method should be undertaken as a prophylactic measure, as soon as recognized.

6. Angiomata, either directly or indirectly, may give rise to conditions which suggest or require orthopedic treatment.

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LYMPHANGIOMA OF THE FALLOPIAN TUBE

By L. W. STRONG, M.D., New York

THE occurrence of a lymphangioma in the fallopian tube is sufficiently rare to justify a report of 2 cases which have been found in the routine examination of tissues at the Woman's Hospital, New York.

The literature on the subject contains but 5 cases, 4 of which are referred to in Veit's *Handbuch der Gynaekologie*, vol. v, p. 190, and also in Liepmann's *Handbuch*, vol. ii, p. 177. The fifth case is one of Dr. O. Frankl's, described by Leighton in the *American Journal of Obstetrics and Gynecology* for 1912, and also referred to in Liepmann's *Handbuch*.

Since the distinction between a lymphangioma and a local dilatation or lymphangiectasis may be regarded as rather indefinite, it is important to note that these 5 reported cases are all described as true tumors by Frankl and by Fromme and Heynemann, who write the article for Veit's *Handbuch*.

Dilatations of pre-existing channels do not take the form of circumscribed nodular tumors; and they occur only where there is a physical cause, namely, the accumulation of secretions or foreign matter requiring removal. No such static conditions were present in the accompanying cases; the tubes were in all other respects normal.

A brief description of the 2 additional cases is given here.

Case 1. Path. No. 18104. A married woman of 48 was admitted to the service of Dr. Ward for an abdominal tumor. At operation a large symmetrical tumor of the ovary was found and a complete hysterectomy was done.

The pathological report gives a uterus of normal size with a normal mucosa. One ovary is replaced by an irregular, solid tumor of dense fibrous tissue extending into the ligamentum ovarii almost to the tube corner. About 1 centimeter from the isthmic extremity of the tube and embedded in its wall is a firm, nodular tumor of about 5 millimeters diameter. Microscopic examination of uterus and ovarian tumor showed fibrosis of the myometrium and a fibroma of the ovary. The nodule in the tube shows obliteration of the tubal lumen with replacement by fibrous connective tissue and round cell infiltration. The nodule itself consists of a mass of lymph spaces lined by a regular endothelium which here and there is undergoing proliferation. The nodule is surrounded by normal musculature.

Case 2. Path. No. 24096. A married woman of 52 was admitted to the service of Dr. Grad for pelvic pain and hæmorrhage. At operation a retroverted uterus was found, giving a purulent discharge from the os. A complete hysterectomy was done.

The pathological examination showed a large, boggy uterus with a stenosed internal os. The ovaries were somewhat enlarged and showed numerous cysts of the follicles. The tubes were of normal size, moderately convoluted, and a well defined, hard nodule was felt in the wall of one. A section of this nodule was taken. Microscopical examination of this nodule showed a reticulum of connective tissue with large spaces of rather uniform size, lined by a simple flat endothelium showing no tendency to proliferate. The nodule is about 0.5 centimeter in diameter. The margins merge without definite boundaries into the connective tissue of the tubal wall.

The fact that in both cases a localized nodule was observed macroscopically and removed for microscopic examination, makes them entirely comparable with the 5 cases already reported. It would appear that these 2 were as distinctly tumors as are the ones recognized by Frankl and others, although they were perhaps smaller than some. Leighton speaks of Frankl's case as the smallest.

The descriptions of all the 7 cases, including the present 2, so closely resemble each other that the inference may be drawn that this is a characteristic, even though very rare, neoplasm of the fallopian tube. Its small size and the fact that it has always been an accidental finding make it plausible that its rarity is more apparent than real. There is nothing in the clinical history of these cases which has any apparent bearing on the tumors.

However, the 2 of the present report are of value, because they were not associated with myomata, as were all the previous ones. This controverts the inference made by Leighton that there is a relationship between the lymphangiomata and myomata. Both my cases were associated with inflammatory conditions, although in both instances the tubes were of normal size, with patent fimbric extremities.

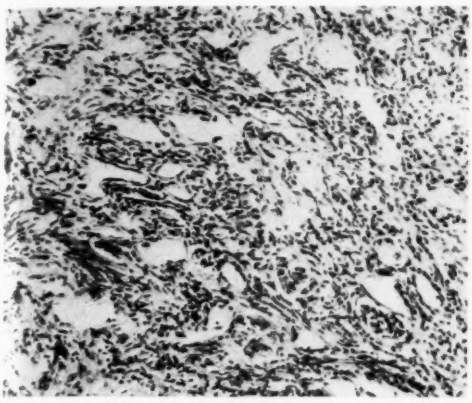

Fig. 1. 18104. Case 1. Photomicrograph of lymphangioma of the tube.

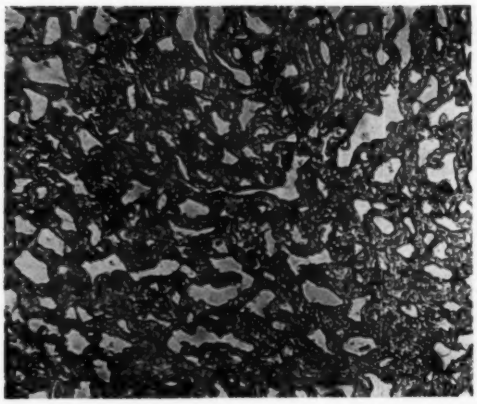

Fig. 2. 24096. Case 2. Zawodnik. Lymphangioma of the tube.

The fact that myomata or adnexal disease was present in all cases indicates nothing more than a condition for which an operation was undertaken, without which the lymphangioma would have remained undiscovered. These tumors have occurred both in the isthmic and ampullary portions of the tube. They have been of small size and oval in shape. It has been suggested by Kermauner that they were potentially malignant, on account of the proliferation of endothelium, and he has therefore related them to endotheliomata. There is certainly no appearance of malignancy in the present cases, and they are to be regarded in the same light as lymphangiomata of the skin and elsewhere. A certain amount of proliferation of endothelium, however, is characteristic of all lymphangiomata.

PERMANENT URINARY RETENTION FOLLOWING PROSTATIC ABSCESS

By R. E. CUMMING, M.D., Detroit, Michigan

ANOTHER etiological factor advanced as directly relative to suppuration in the prostate gland and giving rise to persistent urinary retention, is of sufficient importance to merit, in our opinion, a detailed account as a clinical occurrence.

A brief enumeration of the common causes of retention in the male will reveal as exogenous factors, stricture, traumatic injury, and foreign bodies; as endogenous factors, calculus, median bar, hyperplasic prostate, tumor, the myelitides, and possible vesical diverticuli. The congenital malformations of the urethra occupy a position of increasing importance as indicated by Young. No doubt many such malformations have gone unrecognized in the past. Sudden and complete retention is rarely seen, unless related to injury, foreign body, stone, or congenital atresia of the urethra. The case which we shall present falls neither in the province of congenital or acquired pathology in so far as we have outlined the common and anticipated types clinically observed.

The continuous use of catheters, whether surgically clean, or direct from the pocket of a patient, wielded by surgeon or patient, is fraught with dangers, both of injury and infection. Since the foundation of urology, the pernicious practice of oft-repeated catheterization has presented a problem; the immediate comfort for both patient and physician calls for the catheter and the path of least resistance leads to vicious complications. When skilled specialists cannot avoid "urethral chills," temporary bacteræmias which are sometimes fatal, following urethral instrumentation, how much more impossible it is for the victim himself. It was with these facts in mind that the writer undertook the care and treatment of the case outlined below. He freely admits the prolonged period necessary for recovery not only as evidence of the difficult problem presented, but also as a means of emphasizing the value of exact diagnosis and painstaking operative and postoperative effort. The case history developed as events transpired, will evolve a number of questions for discussion and comment.

CASE HISTORY

H., age 20, white, born in U. S. A., a soldier, was admitted to the hospital, June 18, 1920. The family history revealed no chronic diseases or deformities. The parents and several brothers and sisters were well, in adult life. The patient had had the usual diseases of childhood, but none was considered serious. There was no later serious illness. He was a moderate user of alcohol and tobacco. No gunshot wounds or other casualties were noted. Gonorrhœa in July, 1917, under treatment was apparently cured. Lues denied.

Present illness. During the major part of July, 1919, the patient was confined to bed in a hospital in France, with Vincent's angina. On August 5, 1919, although still in bed, he was allowed to return to his company; he was much improved; and felt well, but weak. When first desiring to urinate, after his discharge from the hospital, he found it impossible, and therefore reported back to the hospital and was readmitted, having been catheterized. He recalled some frequency and burning prior to August 5, while in the hospital; he had never been able to void since that date, catheterizing himself at intervals. On August 7, 1919, 2 days after the retention began, he noticed a sudden very profuse purulent urethral discharge, with a foul odor; this continued without halt for 48 hours, large quantities of pus being evacuated. He does not recall any fever, nor did the profuse drainage from an extravesical source affect the bladder retention or the interval catheterizations.

When seen by the writer in June, 1920, the subjective symptoms were purely those of simple retention. The patient had no pain or discomfort. During the intervening year he had been transferred to the United States and held for observation. The search for a cause of the retention had been unfruitful; various diagnoses were elaborated, including tabes dorsalis, syringomyelia, hysteria, and obstructive prostate. A chronic cystitis was established with colon bacilli the infecting micro-organism. Other than from urine studies, no positive findings were recorded.

Physical examination. An ambulatory patient who weighs 160 pounds shows excellent general nutrition. The special senses, skin and mucous membranes, glandular system, vascular system, heart and lungs are all negative. The blood pressure is 130 systolic, 70 diastolic. The abdomen, nervous system, osseous system, muscles and joints, are normal. The genito-urinary system and external genitals are normal except for first degree hypospadias. The prostate feels very small and boggy when the bladder is empty, with obliteration of median furrow and notch. The vesicles are not palpable. With the bladder distended, the prostate seems to be many times larger, dense, and fluctuant, as palpated rectally. A complete blood examination was negative as were the Wassermann test and examination of the spinal fluid. In view of former suspicions, a consultation with a neurologist was arranged and functional or organic nervous disease ruled out. Cystoscopic examinations were made on June 21 and July 12. Urethro-

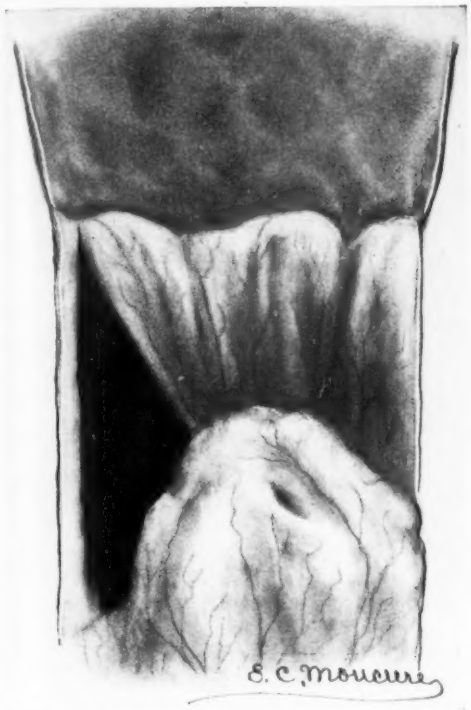

Fig. 1. Schematic drawing of posterior urethra and internal vesical sphincter as seen cystoscopically. The normal verumontanum presents evidence against a congenital anomaly accounting for the irregular tear and destruction of the right lateral wall of the urethra.

Fig. 2. Roentgenogram with bladder and abscess cavity filled with thorium nitrate. Note complete differentiation of the shadows of bladder and abscess cavity. With stereoscopic plates this was most definite.

scopy was done June 21, and repeated June 28. The composite findings were definite resistance to both types of instruments in the region of the internal vesical sphincter; an average capacity of 650 cubic centimeters; huge trabeculations lateral to the trigone with deep sulci in the region of the ureteral orifices, depression of the trigone forming a definite bas-fond with the presence of a distinct median bar projective laterally to approach the picture presented by an encroaching prostate gland. A chronic generalized cystitis with bullous œdema of the base of the bladder and other changes resulting from neck obstruction gave the operator no satisfactory clue in this instance in view of the patient's age. The cystoscope at each examination was withdrawn into the posterior urethra, proving this widely dilated, with all its structures easily recognized, gaping prostatic ducts, verumontanum large, pale, with ragged sinus pocularis. This latter seemed pushed aside to the left of the mid-line and an irregular rent with considerable destruction of the right lateral wall of the urethra was noted, the tear extending from the internal sphincter to the membranous urethra (Fig. 1). The urethroscopic examinations were less satisfactory for the study of this pathology as the field could not be kept dry. Cystoscopically, however, it was evident that the torn urethra furnished an opening into a deep diverticulum. With the beak of the cystoscope introduced and with water distention, a sizable cavity was seen, its walls fibrous, its exact extent undeterminable.

TREATMENT

A study of the roentgenogram will enable the reader to visualize our phenomenon. It should be stated that in one or two instances in which the bladder was filled, a wide dilatation of the right ureter was demonstrated—hydro-ureter from back pressure. The posterior urethra itself was also considered as definitely dilated. Two suprapubic, one perineal, and three Young punch operations were performed. On August 20, 1920, a suprapubic cystotomy enabled direct exploration of the extravesical pathology. I quote my original note: "Exploration by finger revealed the condition found cystoscopically except that the internal urethral meatus was extremely contracted and sclerotic to the degree that the tip of one's little finger could not enter the urethra. After dilatation, with the finger in the urethra, the lateral wall loss was verified and

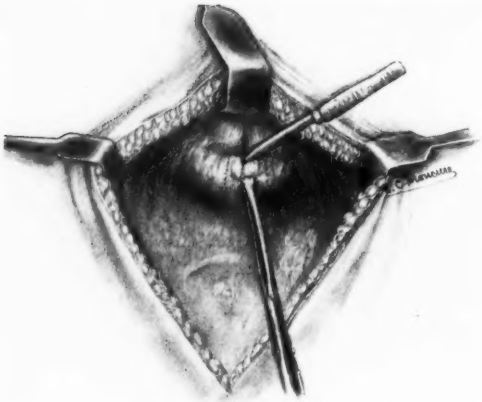

Fig. 3. Schematic drawing of open bladder. Two hæmostatic sutures may be noted lateral to the internal urethral meatus; between these a deep incision was made, extending through mucosa, muscle, and the sclerotic wall of the cavity external to the bladder.

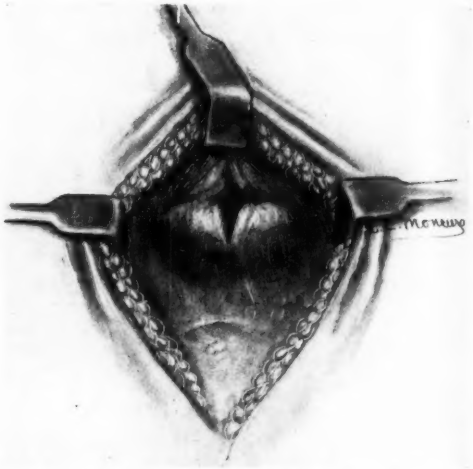

Fig. 4. Drawing showing incision through internal sphincter completed.

the cavity external to the bladder found to extend posterior to the bladder and urethra; its interior extent could not be determined." The operation then consisted of deep splitting of the sphincter in the mid-line after inserting lateral mattress sutures for hæmostasis. The lateral opening into the urethra was enlarged above in an attempt to make the bladder and false cavity one. The bladder was then closed with drainage.

The result from this operation was poor; an infection of the bladder and wound postponed healing so long that sclerosis and scar contraction reproduced the original condition, except that for a time the patient was able to void 2 to 4 ounces of urine.

After three trials, considerable tissue having been removed from the sphincter area, the Young punch method was discarded as inadequate; meanwhile, although the patient's general condition was excellent, catheters were constantly in use. The second suprapubic cystotomy was forced as an abscess developed in the incision scar. When the scar was opened a large sinus was disclosed leading down into the pelvis to the right of the bladder where the peritoneal wall constituted the superior and anterior border of a large abscess. Incidental to a timid exploration, the swollen, inflamed appendix poked itself into sight. This was delivered, the peritoneum was opened freely, the omentum was hurriedly spread over the intestinal mass, and the whole area protected by tamponade. After the appendectomy and the placing of drains intraperitoneally, the bladder was re-opened for examination, with findings similar to those above described. The sphincter was more lax and the unrethral opening nearer to the bladder cavity. No further reconstruction was attempted. Complete abdominal healing occurred in 5 weeks, the retention still persisting.

A third cystotomy was performed April 20, 1921, this time by the perineal route. With a generous urethrotomy incision, it was possible to palpate the false cavity outside the bladder; this seemed to be flattened out in its long axis and the internal sphincter presented a definite sclerotic ring between bladder and urethra. Simple tears served to widen the opening of the urethral cavity, and the internal sphincter was widely dilated with two parallel Goodell dilators. An incision down to the rectum in the mid-line served further to open the bladder and to connect the bladder cavity with that outside. (A block of tissue excised in the area of the incision described, failed to show microscopically prostatic tissue or muscle; it was simply scar.) The false cavity was scarified and packed with iodo-

form gauze; a large rectal tube wrapped with several layers of iodoform gauze was inserted into the bladder for drainage.

Since this latter operation, a catheter has never been necessary; the patient's recovery and progress was satisfactory and healing consumed only an average period. A perfect result was not obtained as a slight incontinence persists. On coughing or jolting or occasionally while walking a few drops of urine escape.

In a communication this month, 2 years after the final operation, the patient is well and reports no retention but a slight occasional leakage, but no kidney disturbance.

COMMENT

In retrospective consideration of this laborious and imperfect cure of an obstinate retention, one is tempted to say that the perineal operation should have been the original manuever; it was seriously considered and discarded principally because of the poor bladder access one might hope to obtain, and in fear of a graver degree of incontinence than actually developed. As to the incontinence, would it be wise to try to improve upon it by a plastic tightening of the urethra in the region of the cut-off muscle? Apparently the bladder neck will not interfere again, and should the incontinence increase or the perineal scar reopen, a local resection and closure might give an even more satisfactory end-result.

An acute massive prostatic abscess giving rise to retention is of no particular significance; to have this common chain of events followed by a complete and permanent retention with apparent destruction of the prostate and possibly of the seminal vesicles which in this instance were never palpated, is indeed a calamity. Whether the cavity described and presented photographically was in fact a result of prostatic destruction is frankly conjectural. No prostate or vesicles were found on examination or operative exploration and the patient was otherwise anatomically sound save for a slight hypospadias. Sexually, he was normally active prior to and including the period of retention, and has remained so.

The mechanism of the retention I explained by considering the urine-filled extravesical cavity as a curtain, calling into play the cut-off muscle since this urethral diverticulum had a generous opening, and successfully inhibiting all detrusor activity of the bladder itself. The more pressure exerted from the bladder and the accessory muscles, the more widely and tightly did this watery curtain prevent the passage of urine. The sclerosis resulted.

Fig. 5. Illustrating method for dilatation of internal vesical sphincter. Two Goodell uterine dilators, placed parallel to one another, after insertion through perineal wound.

At the beginning of this paper, I referred to congenital malformations of the posterior urethra, particularly the so-called verumontanal veils, three types of which were described by Dr. Young. We have seen a case of the rarest

of these types within a year with permanent relief of the retention by a plastic operation. It seems to me impossible to consider the case above described as congenitally anomalous although inherent weakness of the urethral wall and an imperfect, easily destroyed prostate may have been coincident with the hypospadias. Whether the prostatic infection was gonorrhœal or not is futile to contemplate.

SUMMARY

The case presented indicated that rare and grossly destructive prostatic infections may produce a complete and permanent retention of urine, directly resulting from a false cavity beyond control of the normal expulsory apparatus. Multiple operative proceedings resulted in a permanent, safe and workable relief of the retention.

SUBCUTANEOUS EMPHYSEMA CAUSED BY AN ANAEROBIC MICROCOCCUS (STAPHYLOCOCCUS AEROGENES SCHOTT–MUELLER) COMPLICATING DIABETES MELLITUS

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A CONSIDERABLE variety of complications often modify the clinical course of diabetes. Gangrene is one of the most common complications of this disease. Infections, especially by the staphylococcus aureus, are by no means unusual. Suppurative lesions caused by bacillus coli in diabetic patients have occasionally been associated with gas formation (8).

Gas formation in tissues, in general, has usually developed from infected penetrating wounds. Although a variety of anaerobic organisms has, from time to time, been isolated from gangrenous processes associated with gas formation, still, in the vast majority of instances, one of the well-known types of anaerobic bacilli has been the infecting organism. The occasional occurrence of anaerobic cocci in such processes has attracted very little interest. These anaerobic cocci, when present, have, with few exceptions, been associated with other organisms.

Anaerobic cocci capable of gas formation in either lesions or culture, have been isolated from the oral cavity (9, 10, 11), from otic infections (12), from pulmonary gangrene (4), from tuberculous cavities (14), from suppurative appendicitis (16), from the female genital tract (5), from suppurative bartholinitis (15), from puerperal infections (1, 3, 6, 13), and from suppurative periurethritis (2).

These anaerobic gas forming cocci represent several types which are distinctive morphologically and culturally. They have in several instances occurred in pure cultures from lesions, and have been considered as the etiological factors.

History of the case here reported. White male, 58 years old, an engineer on a steamer, was admitted to the U. S. Veterans Hospital No. 35, December 4, 1921, with the diagnosis of tarsal gangrene, and tabes dorsalis. On admission the patient complained of pain in his foot, pain in his right shoulder, and general weakness.

It is important to mention that his mother died from diabetes and two brothers have diabetes.

Past history was unimportant except for polyuria. Diabetes was unrecognized. Present illness started 5 days before admission, when the little toe, and later the foot, became swollen and red, and the little toe became gangrenous. Soon afterward mild pain was felt in the right shoulder which increased in severity. Weakness was progressive.

Physical examination showed the patient to be poorly nourished. There was a strong odor of acetone in expired air. The small toe on the left foot was gangrenous with the line of demarcation well formed.

Fig. 1. X-ray plate showing multiple air containing pockets in axilla and upper part of arm.

Fig. 2. A microphotograph showing the grouping of our micrococcus.

The right shoulder was very slightly reddened and very tender to pressure. Movements were painful although the scope of motion was not restricted.

Laboratory findings on admission were as follows: Urine showed a trace of albumin, a few hyaline casts, and many pus cells; volume for 24 hours was 3,120 cubic centimeters containing 5 per cent glucose, and was positive for acetone and diacetic acid. The blood Wassermann was negative. White blood count of 29,400, with 85 per cent polymorphonuclear cells. Red blood count of 3,400,000.

It was concluded that the patient did not have syphilis, and the other associated clinical manifestations not mentioned here were no doubt diabetic.

Course of illness. Three days after admission the patient had a slight chill, the temperature rising to 102 degrees F., which was soon followed by an increase in the severity of the pain in the right shoulder. Swelling and redness increased about the shoulder. No fluctuation could be elicited at this time. Movement of the shoulder was markedly restricted on account of pain. At this time the lungs were normal, and a blood culture was negative. The gangrene of the little toe had become worse and had extended to the adjacent toe. On the following day two small blebs 0.5 centimeters and 1.5 centimeters in diameter, respectively, appeared over the trapezius muscle. A crepitation characteristic of air in tissue was felt posterior to the outer third of the clavicle. The commencing subcutaneous emphysema showed in an X-ray plate taken at this time.

The general condition became worse. By the tenth day after admission the subcutaneous emphysema associated with fluctuation had extended in all directions, including the axilla and upper part of the arm. The X-ray plate (Fig. 1) taken at this time showed multiple air containing pockets in these regions. On the eleventh day the skin sloughed over the shoulder and much foul smelling greenish yellow pus was discharged. Bubbles of gas escaped freely, especially when pressure was applied. After spontaneous rupture, the process did not extend, although it continued to drain profusely. The patient became progressively worse. Death occurred on the forty-sixth day after admission.

Autopsy findings. Gangrene involved the four outer toes of the left foot, a small area over each knee, and an area over the sacrum. No crepitation was present in these locations.

There was an ulcerated area 2 centimeters in diameter situated over the right shoulder immediately posterior to the outer third of the clavicle through which much frothy, foul-smelling pus was discharged. A probe could be inserted backward and downward through this opening for a distance of about 10 centimeters. On dissection, multiple communicating pockets containing pus and gas were found in this region. The shoulder joint was not involved. Only the soft parts about the shoulder and upper third of the arm were involved.

The bronchi showed purulent bronchitis.

Both lungs were collapsed. Small areas of consolidation with abscess formation occurred in the lower lobe of the left lung, and in the upper lobe of the right lung. Gas was not present in these abscesses.

The pancreas was small and hard. Numerous small abscesses occurred in the cortex of each kidney.

Other findings had no direct bearing on our observations here reported.

Anatomical diagnosis:

1. (Diabetes) gangrene of toes, knees, and sacrum,
2. Necrosis of right shoulder with subcutaneous emphysema,
3. Bronchopneumonia associated with abscess formation,
4. Acute suppurative nephritis,
5. General arterial sclerosis (senile type),
6. Chronic intra-acinar pancreatitis,
7. Cirrhosis of liver (Laennec's type),
8. Cystitis,
9. Old pleural adhesions.

In the bacteriological examination of our case stained films of pus from the right shoulder showed only gram positive cocci with the morphology of staphylococcus aureus. Aerobic cultures on red blood agar plates showed staphylococcus aureus in pure cultures. Cultures in deep meat media formed much gas with fœtid odor. Plating from the bottom of a meat tube on enriched media in an atmosphere of hydrogen, and over pyrogallic acid mixture, showed colonies of staphylococcus aureus and colonies of the anaerobic staphylococcus. The anaerobic staphylococcus occur red in the lesion associated with staphylococcus aureus, as was shown by examination of several specimens of pus. The anaerobic staphylococcus grew more rapidly in symbiosis; when cultured together, the two microorganisms resembled a pure culture of staphylococcus aureus. In pure culture the anaerobic coccus occurred singly, in pairs, and in clusters (Fig. 2). The size was similar to the staphylococcus aureus. It was gram positive. The optimum temperature was 37 degrees C. It required the strictest anaerobiosis. Surface colonies were very small and slightly grayish. Deep colonies became 1 or 2 millimeters in diameter and were spherical.

The anaerobic staphylococcus has, so far, failed to grow even under the strictest anaerobic conditions in ordinary media, or on casein digest substance (7) used for anaerobic organisms difficult to grow. It grew slowly, but well, in deep meat media, and in ordinary media enriched with whole blood, serum or with digest muscle substance.[1]

[1]Muscle digest substance was made by digesting muscle with pancreatic extract.

In ordinary media enriched with serum covered with vaseline gas was produced, and the hydrogen-ion concentration fell from Ph 74 to Ph 68. When either glucose, lactose, or sacchrose were added, the hydrogen-ion concentration never fell below Ph 6.6 even after 15 days' incubation, and the volume of gas was not increased over that shown by the tubes without sugar.

It was non-pathogenic for rabbits and guinea pigs. When given with staphylococcus aureus to a rabbit intravenously or subcutaneously, abscesses developed which showed staphylococcus aureus only in subsequent cultures.

Our organism resembles the staphylococcus aerogenes described by Schottmueller (13), which he isolated from patients with puerperal fever. He found it in his cultures from the cervix, from abscesses in the cul-de-sac, from purulent peritonitis, from thrombophlebitis, and from the blood. It was isolated from 20 patients, and was seen 8 times in pure culture. It grew only in media enriched with blood or serum, and best at 37 degrees C. It was gram positive, measuring 6 to 8 microns. It was non-pathogenic for mice, guinea pigs, and rabbits.

DISCUSSION

The development of the subcutaneous emphysema here reported was no doubt greatly influenced by the presence of staphylococcus aureus.

A relationship between gas production in the tissues and hyperglycæmia could not be established. In culture the volume of gas produced by the anaerobic staphylococcus was subject to moderate variation, and was not appreciably more when glucose was added to the media. When glucose was added to the media the hydrogen-ion concentration fell very little more than when glucose was absent; after 15 days' incubation only a small part of the glucose had disappeared from the media.

When the organism isolated by us was grown in pure culture in meat media, the fœtid odor already referred to was scarcely perceptible. In media enriched with serum, it was not recognizable.

Gauze saturated with culture and introduced into traumatized muscles of rabbits

failed to produce evidence of infection. Schottmueller was unable to reproduce disease in laboratory animals even after administering large doses.

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FIBROIDS IN THE PUERPERIUM[1]

By E. W. FISCHMANN, M.D., F.A.C.S., Chicago

OCCASIONALLY a woman with a myomatous uterus bears a child without experiencing any difficulty, but fibroids often have a decided influence upon conception, pregnancy, labor and the puerperium. Pregnancy, labor, and the puerperium also have an influence upon these growths and often produce changes in them.

Considerable discussion has taken place as to the rôle fibromyomata play in the causation of sterility. Most authors state that they markedly lessen the fertility of woman, but Hofmeier contends that they affect conception but little, if at all. Olshausen undoubtedly was correct when he pointed out that the location of the tumor must be taken into consideration, and that the more a fibroid encroaches upon the endometrium the more is it apt to interfere with the nidation of the fertilized ovum. Thus it is found that submucous and interstitial fibroids, on account of the endometrial changes and the distortion of the uterine cavity they occasion, predispose to sterility, while subserous growths, especially when pedunculated, may not affect the fertility of woman at all.

Interference with the proper development of the pregnant uterus and the products of conception is frequently noted, especially in sessile submucous and interstitial growths on account of the distorted cavity and the development of a diseased decidua as pointed out by Pinto and Krebs. These may lead to abortion with its attendant risk from hæmorrhage and sepsis, or if the pregnancy goes to term, malposition of the fetus or abnormal location of the placenta often result, with the well-known dangers to mother and child.

Alarming symptoms due to pressure upon the intestines, bladder and ureters have been described by Coe.

During gestation, fibroids as a rule partake of the succulence, the increased blood supply and the muscular hypertrophy of the uterus, the extent of these changes depending upon the amount of unstriped muscle in the tumor and upon its relation to the uterine wall. Thus these changes are most marked in sessile and interstitial growths, especially if they be mostly myomatous. The increase in size may at times be so marked that tumors which because of their small size were undetectable before pregnancy took place, become readily palpable (De Lee). Necrobiosis is not uncommon during gestation, due to insufficiency of the blood supply, torsion of the pedicle or impaction of the neoplasm. Changes in the location and the shape of fibromyomata are often noted; the well-known round tumors become more or less flattened and elongated.

[1] Read before the Chicago Gynecological Society, April 18, 1924. (For discussion, see p. 374.)

Dystocia, uterine atony and undue hæmorrhage may be encountered during labor on account of the presence of fibroids; these conditions not infrequently call for operative intervention and thus add to the hazards of mother and child.

The tumors themselves suffer during labor on account of impaction, twisting of their pedicle, and the temporary anæmia during contractions. With the onset of labor pains, changes in the vascular supply of fibromyomata not infrequently occur. The capsule of the tumor may be torn loose from the surrounding uterine musculature causing subcapsular hæmorrhages. This occurrence may initiate necrobiotic changes in the new-growth or augment them if they have started during prgnancy.

EFFECT OF FIBROIDS UPON THE PUERPERIUM

Bland Sutton well states that the danger from the complications of fibroids is not over with the termination of labor, but that the woman's life is in jeopardy even during the puerperium. Hofmeier contends that this danger has been greatly overestimated, but a comprehensive study of the literature tends to support the views of the former. Thus we find that fibromyomata may cause the following complications in the puerperium: (1) hæmorrhage, (2) febrile course, (3) subinvolution, (4) peritonitis, (5) septicæmia and pyæmia, (6) inversion of uterus, (7) torsion of uterus, (8) embolism, and (9) acetonuria.

Hæmorrhage may occur immediately after the expulsion of the placenta, especially if the latter be located directly over a fibroid. The uterine musculature contracts but the placental vessels cannot. Thus the neoplasm interferes with the uniform retraction of the uterus. Intramural and sessile growths cause greater loss of blood, often alarming hæmorrhages, which may result fatally, as reported by Glarner and by Wertheim (2 cases). Pedunculated growths cause considerably less loss of blood immediately after delivery of the placenta, because they interfere less with uterine retraction, but these latter growths not infrequently cause bleeding several days postpartum (Engstrom, Troell, Neubner) which may keep up for several weeks, often until the tumor is expelled or removed. The expulsion of pedunculated submucous growths is a common occurrence; this may happen during the first week postpartum (Cheron's case) but may be delayed for several weeks (Schneider's case after 5 weeks; Kuchenmeister after 45 days; Field, Barnes, after 2 months); Roehrig and Lacasse witnessed the explusion of a fibroid immediately after the placenta. MacFarlane records a case of abortion at 4½ months and after a few days the patient passed two tangerine sized fibroids on two successive days. Intraperitoneal hæmorrhage has been described by Hamilton and by Gusserow as coming on 24 hours after delivery due to rupture of a superficial vein coursing over a fibroid. Schmorl and L. Meyer each encountered a case where fatal intraperitoneal hæmorrhage in the puerperium was due to rupture of a vein in a twisted pedicle of a fibroid tumor.

On account of the malpositions of the fetus, dystocia, uterine atony and bleeding during labor, operative treatment is often resorted to and not infrequently the placenta has to be removed manually. This predisposes to infection and in some cases may be responsible for the febrile puerperium. But some puerpera run a feverish course where child and placenta are expelled spontaneously and the genital tract is not invaded from without. In most of these cases the placenta lies directly over the tumor, and when the former is expelled the placental site acts as an infection atrium. Troell and Engstrom admit that severe puerperal sepsis may be caused by a degenerated fibroid, but neither has observed such a case. Neubner and Landon agree with Troell and Engstrom that in nearly all these cases the infection is introduced from without by intervention, or else it reaches the fibroid from surrounding organs, as the appendix, the bowel, or an infected tube. The possibility of a hæmatogenous infection of the fibroid has been referred to by different authors. The marked predisposition of fibroids to secondary infection postpartum, is emphasized by Hammerschlag. But W. A. Freund believes that symptoms of a severe toxæmia may have their origin in a degenerated fibromyoma without evidences of in-

fection. Such cases are mentioned by Troell, Engstrom, and others.

A fibromyoma in the uterine wall as a rule hinders or retards the involutionary changes of the puerperium in the same manner that it interferes with the normal retraction of the uterus after the expulsion of the placenta. The uterus remains large and boggy until the neoplasm is expelled sooner or later. If expelled soon, the tumor may have suffered but little change of its structure, but if not extruded until several weeks later, then various stages of degeneration may be present. As a result of these changes the necrotic mass is often expelled piecemeal, or small pieces of necrotic tissue may be washed away with the extremely malodorous lochia.

Gans reports a case of a large intramural fibroid which burst into the peritoneal cavity on the third day postpartum, and death resulted from peritonitis due to the necrotic material. Von Franque also reports a case of a fibroid free in the peritoneal cavity, having lost its connection with the uterine wall, which became secondarily infected from the bowel and caused peritonitis.

Simpson (quoted by Engstrom) saw an infected pedunculated subserous fibroid which was adherent to the anterior abdominal wall, and when involution took place, the growth was torn loose and peritonitis resulted. Again, Glarner and others report cases in which death from peritonitis followed the removal of infected subserous fibroids.

Illustrative of the difficulty in diagnosis as well as the possibility of degenerated fibromyomata causing symptoms of severe sepsis, is the case operated upon by MacFarlane. The pre-operative diagnosis of acute appendicitis was changed when a necrotic intramural fibroid was discovered. A panhysterectomy was performed which was followed by death the next day. Wiener (quoted by Neubner) describes a case of an intramural tumor the size of a man's head. The patient's temperature was steadily rising and she had repeated chills. An abdominal hysterectomy was followed by death from pyæmia on the ninth day postpartum.

The puerperal expulsion of a fibroid may be the cause of an inverted uterus. Prochovnik was called to see a case of inversion which occurred on the tenth day postpartum. Spencer observed a postabortive and a postpartum inversion of the uterus. The last author also describes a submucous fibroid which caused severe bleeding 11 days after delivery. While performing the operation of morcellement, an inversion of the uterus occurred, affording Spencer a splendid opportunity to remove the tumor completely. At the end of the operation he replaced the inverted organ. Winter observed a somewhat similar case. Traction upon a presenting fibroid caused inversion, and as soon as the traction was released after the removal of the new-growth, the uterus receded. Mackenrodt makes mention of a 39-year-old primipara who bled for 3 weeks postpartum. On the twenty-second day he prescribed ergot and shortly thereafter a degenerated fibroid presented into the vagina. The latter was found to be adherent by a broad pedicle to the fundus of an inverted uterus. He thinks the inversion occurred before the ergot was given, but it was not discovered.

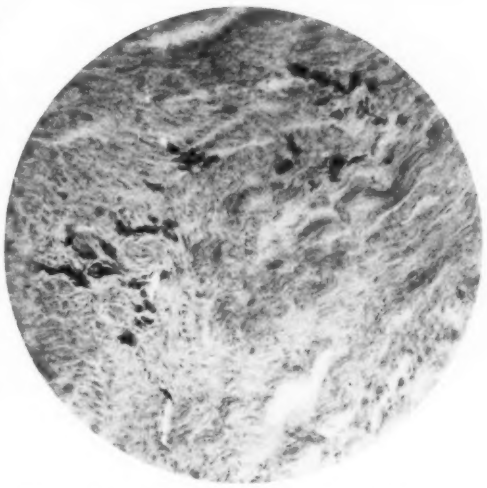

Fig. 1. Low power magnification (100 × diameter) of necrotic tumor showing bundles of muscle fibers without nuclei and beginning calcification.

Holowko reports a case of torsion of the uterus due to a sessile subserous fibroid of the fundus, which happened when the patient left her bed on the tenth day postpartum. At

Fig. 2. Medium power magnification (150 × diameter) of an area with more advanced calcification.

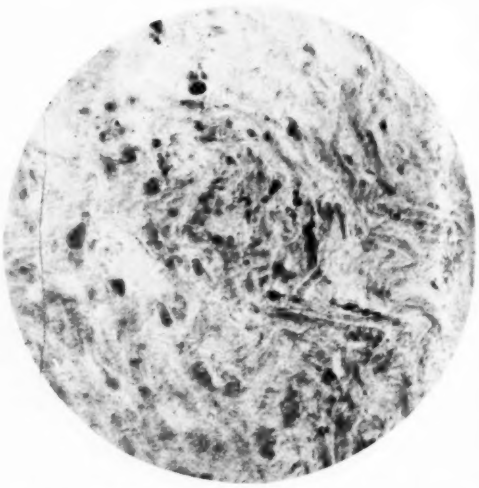

Fig. 3. High power magnification (380 × diameter) of an area showing fat droplets in the necrotic muscle fibres.

operation a 360 degree rotation at cervico-corporal junction of the uterus was found, and the fibroid showed multiple hæmorrhages and cystic degeneration. Van Herff mentions a case of torsion of the pedicle of a fibroid in the puerperium.

Bossler and Weindler speak of pulmonary embolism as a complication of degeneration of fibroids postpartum. Acetonuria due to fatty degeneration of fibroids in puerperæ has been found by Troell. Keith has encountered a case of ileus due to compression by a large degenerated fibroid during the lying-in period. In cases in which a submucous fibroid blocks the cervical canal and prevents the escape of lochia, lochiometra is mentioned by Neubner and De Lee as causing intoxication symptoms. Krieger reports a case of rupture of a non-pregnant uterus due to a fibroid. Hitschmann has found atrophy of the endometrium over a fibroid and invasion of the uterine musculature and blood vessels by syncytium. Meyer Ruegg states that aseptic necrosis may extend to the wall of the uterus and may cause perforation. In view of these facts and observations, it is singular that not a single case of rupture of the uterus during the period of the puerperium has been recorded.

EFFECT OF THE PUERPERIUM ON FIBROIDS

In most instances a fibroid that has increased in size during pregnancy on account of the increased vascularity, will suffer the same changes during the puerperium that the uterus does. As a rule the retrogressive changes in the former keep pace with those in the latter. These changes are described under the term of involution and consist both in the uterus and the new-growth of fatty degeneration and absorption of muscle cell contents, of thrombosis of newly formed vessels and compression of the larger blood vessels. Landau has shown that if the retrogressive changes in the fibroid extend beyond the normal, hyaline changes and at times myxomatous changes may be observed. He has also found that if a thrombosis of the nutrient vessels of a fibroid occurs, hæmorrhagic and anæmic infarcts result and often gangrene. Troell states that diminution in size of a fibroid is a common observation, especially if the tumor contain many muscle fibers and be sessile or interstitial. At times the shrinkage may be so marked that the tumor cannot be readily palpated and sometimes is thought to have disappeared; Scanzoni and Spencer each report such a case. As a rule, the diminution in size post-

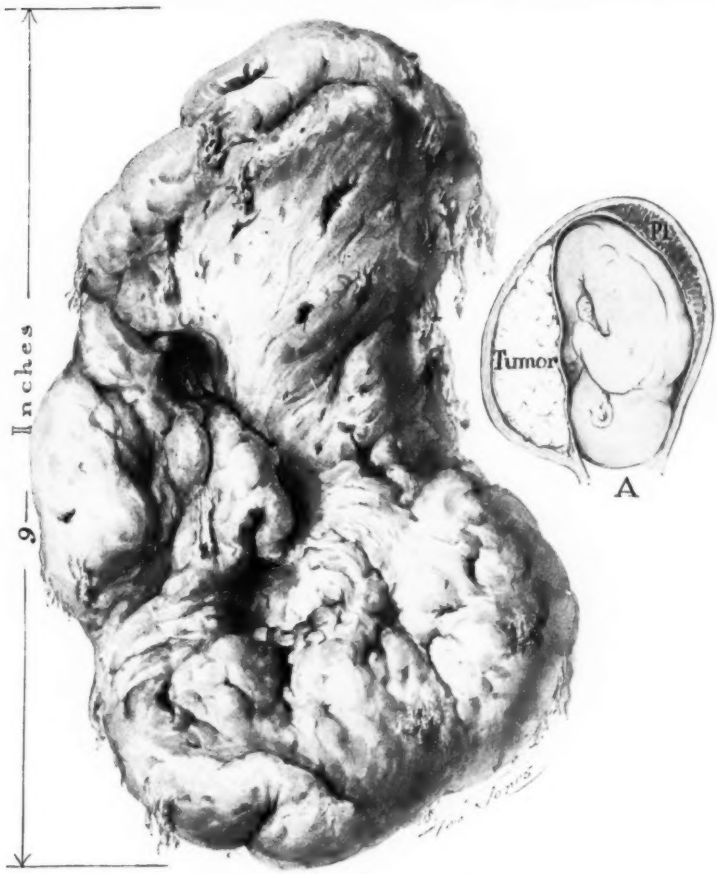

Fig. 4. Drawing of specimen showing fibroid in author's case.

partum is commensurate with the increase during gestation.

Complete disappearance of fibromyomata has been mentioned by Gusserow, Kosmak, and Doran; but Kelly, De Lee, and Lockyer have never observed such a case and question this occurrence. Olshausen however, states that such a possibility must be admitted. V. Lott records a case of spontaneous cure of a large fibroid due to suppuration.

Again, fibromyomata may increase in size during the puerperium, because of progressive fatty or myomatous changes, or as Munro Kerr has observed on two occasions, the tumors may continue the increase in growth that started during gestation. Hammerschlag, after an extensive histological study of the changes occurring in fibromyomata, came to the conclusion that the changes that occur postpartum do not differ from those in the non-pregnant state, and he takes exception to the theory of the trauma of labor, but a recitation of the reported cases would convince any one that while the same changes occur in both states, they are decidedly more marked and more frequent during the puerperium. Furthermore, these tumors are more prone to secondary infection postpartum, probably on account of (1) the retrogressive changes initiated during pregnancy, (2) the puerperal changes in the mucosa, and (3) the oft called for operative

intervention. There has been considerable discussion as to the time when necrobiotic changes begin. Von Franque holds that they frequently originate during gestation because of compression of the thin walled nutrient vessels, but Gusserow thinks it scarcely probable, because of the good blood supply at this time. The latter contends that the lessened blood supply during the puerperium is the cause of these changes and that they may be ushered in by the trauma of labor, when the capsule of the tumor is torn loose from the surrounding myometrium, when subcapsular hæmorrhages and even thrombosis of the nutrient blood vessels may take place. That necrosis of a fibroid may have its beginning during pregnancy is illustrated by the cases of Von Opitz and Waldo. Von Opitz peeled out a completely necrotic fibroid from the uterine wall while attempting to remove the placenta manually. Waldo operated upon a case on the third day postpartum and removed a gangrenous fibromyoma.

In support of the possibility of the occurrence of an aseptic necrosis can be cited the cases of Benthin and Spurney. Benthin found a total necrosis of a large fibroid after an abortion and aerobic and anaerobic cultures from the neoplasm were sterile. As no other etiological factor was discovered he believes the degeneration was due to the trauma of labor. Spurney's patient, after a perfectly normal delivery, was seized suddenly with severe abdominal pain on the tenth day postpartum, but had no fever and only a slight leucocytosis. At operation red degeneration of a large intramural fibroid was found. It was demonstrated to be due to a thrombosis.

Hammerschlag describes four stages of necrobiosis of fibromyomata: (1) simple necrosis without demarcation, (2) necrosis with softening, (3) necrosis with localized suppuration, and (4) gangrene of neoplasm. He states that (1) and (2) are not infrequently seen, as is illustrated by the cases cited above. Many such cases appear in the literature. He states that (3) and (4) are due to microbic invasion. The infection may be introduced from without when the uterine cavity is entered, or it may be brought to the tumor by way of the bloodstream, or reach it from an infected surrounding organ.

Suppuration of fibroids is usually associated with more or less gangrene, and has been described to occur more often in submucosal growths than in the intramural variety. An interesting case of total disappearance of a fibroid due to suppuration was observed by V. Lott. While exploring the uterine cavity manually he found a tumor the size of a child. Three weeks postpartum the patient was up and about, the temperature gradually rose and there was a foul smelling vaginal discharge. The tumor steadily diminished in size until it could be felt no more, and when a laparotomy for ovarian cyst was done a few years later, the uterus showed no vestige of a tumor. At no time was any tissue passed, so that the disappearance of the fibromyoma was in all probability due to suppuration, gangrene and enzymatic action.

That suppuration may cause enucleation of an interstitial fibrous tumor is illustrated by Bland Sutton's and by the author's case. Bland Sutton was called to see a case of dystocia due to a large tumor. In order to determine whether it was a solid or cystic growth, he put in a trocar but found no fluid. After a septic course of 5 weeks, a sloughing fibroid escaped from the uterus and 8 weeks after delivery the patient was well.

The products of suppuration of a fibroid may escape into the free peritoneal cavity (Gans' case); through the anterior abdominal wall (Neugebauer's case): through a fistulous tract between tumor and the vagina (Lefaur's case) or accumulate in the cul-de-sac of Douglas (Herman's case). Jakobs observed pus from a suppurating fibroid escaping from the umbilicus during the latter months of pregnancy.

Submucous and interstitial myofibromata may be expelled from the uterine cavity. In pedunculated submucosal growths it is not an uncommon occurrence as reported by Neubner, Troell, Engstrom and many others. The sooner after labor they are expelled, the less marked are the retrogressive changes in them. In the majority of the cases hæmorrhage and a profuse foul-smelling lochia is present and not infrequently constitutional

symptoms of sepsis. Because of the necrotic changes in the fibroid and uterine contractions, the tumor gradually loses its connection with the uterus and is expelled by the contractions. Bland Sutton records a gangrenous submucous fibroid which protruded from the uterus on the thirteenth day postpartum. Without operative interference the patient died of sepsis.

Calcification of a fibroid during the puerperium is referred to by Troell. No other writers make mention of it. Areas of lime salts deposits of various sizes were noted between and about the muscle fibres in my case. The possibility of sarcomatous degeneration in the puerperal state is furnished by the cases reported by Scheurer and by Spencer.

TREATMENT

A word or two as to the treatment of these new-growths in the puerpera may not be amiss. If the woman is allowed to go to term and a fibroid is present, cæsarean section with immediate myomectomy or hysteromyomectomy undoubtedly is the safest procedure (Kosmak). If this is not the operation of choice, Neubner advises watchful expectancy and warns against operative delivery from below and manual removal of the placenta on account of the danger of infection.

If after delivery the patient shows evidence of sepsis, hæmorrhage or increase in the size of the fibroid, conservatism is the safest practice, although Bland Sutton and Kosmak advise an immediate hysterectomy in cases in which a fibroid has been pushed up out of the pelvis during pregnancy or labor, and if, a few days postpartum, any of the foregoing symptoms appear.

As to the operative course, curettage, marcellation, myomectomy and vaginal, supravaginal, and total hysterectomy have been recommended. But these patients do not stand surgical treatment very well, there is danger of perforation of the uterus during curettage, danger of contamination of the peritoneum and the danger of shock. Thus Bland Sutton mentions a death from shock during an attempt to remove a submucous fibroid in a puerpera. Marx witnessed gangrene of the bladder after marcellation.

REPORT OF AUTHOR'S CASE OF A SUBMUCOSAL FIBROID

Mrs. Y., 40 years old, a primipara, had her last menstrual period, December 16, 1922. She was first seen by me July 23, 1923. Examination at this time revealed a rather large, well-nourished woman, weighing 212 pounds. The abdomen was markedly enlarged and symmetrical. The fundus of the uterus reached 3 fingerbreadths above the umbilicus and extended well into both iliac fossæ. On palpation two longitudinal fetal ovoids could be made out; the consistency seemed uniform. Only one set of heart tones was heard. As twin pregnancy was suspected, an X-ray examination was suggested, but was refused. She went through the remainder of her pregnancy, complaining of a feeling of distention and heaviness. On September 6, the membranes ruptured and September 8 at 8.00 a. m., pains began and at 8.00 p. m. she entered the hospital. Rectal examination showed the cervix fully dilated; right occipito-anterior. The pains were irregular, but fairly strong. September 9 at 4.00 a. m. the head was on the perineum but made no progress from then on. Low forceps were applied and a male child weighing 8 pounds 8¾ ounces was delivered at 6:30 a. m. The fundus of the uterus remained above the umbilicus and another fetal ovoid seemed to occupy the right side. So the hand was introduced into the uterine cavity and the placenta peeled itself off from the left lateral wall near the fundus, and soon I could feel asymmetrical retraction of the organ as the right half did not take part. It was occupied by a semi-solid mass of unequal consistency, which did not protrude any more into the cavity than it did towards the peritoneal surface; it was more or less flattened. Without any further manipulation the patient was returned to her bed in good condition.

Subsequent course. An hour and a half after delivery the patient was seized with a severe chill lasting twenty minutes; another one occurred an hour later, lasting thirty-five minutes. She experienced severe chilly sensations in the afternoon and evening. September 10 she had two chills, and September 11, two more. After the first chill her temperature rose to 105.8 and ranged from 101 to 105 for the next four weeks. The uterus did not change in size, shape or consistency during this period. There was a profuse and exceedingly foul-smelling lochia. The patient was seen in consultation with Dr. Barrett, and the following treatment was agreed upon.

Fowler's position was used to facilitate drainage. Fluid extract of ergot drops 25, three times a day was given to aid involution and possibly in the expulsion of the fibroid. Iodine douches were given three times a day. The patient's condition remained unchanged until October 4 when she again experienced "labor pains" every fifteen minutes. Suddenly there was a gush of thin, malodorous pus, about 1½ pints. The pains continued and the following day, upon vaginal examination, the cervix

was found somewhat dilated with a mass presenting which had the feel of a macerated fetal head. October 6, under gas anæsthesia, an attempt was made to extract this mass, which was finally accomplished by the application of the Tarnier forceps. Another gush of pus followed its delivery. There was no bleeding and the uterus contracted readily; pituitrin and aseptic ergot were given hypodermically. The patient's temperature dropped immediately, the discharge lessened and ten days later she was discharged. She has been in perfect health since then, but she has not menstruated to date.

Laboratory Tests. The urine has been negative except for a trace of albumen and an occasional granular cast during the febrile course. The leucocytes on admission were 8,000; after the first chill, 24,000 and thereafter from 12,000 to 16,000 until the mass was removed, when the count fell to 6,000. Differential counts showed from 70 to 85 per cent polymorphonuclears. Hæmoglobin, on admission was 85 per cent, but fell to 60 per cent during the febrile state. Erythrocytes on admission were 4,500,000, and then gradually fell to 3,000,000. Two blood cultures proved sterile. Smears from the lochia and pus at different times showed many colon bacilli and staphylococci. On one occasion, a pure culture of colon bacilli was cultivated from the urine.

Examination of specimen by Dr. Jaffé. The macroscopic examination shows an irregular and flattened mass about 25 centimeters long, 10 to 15 centimeters wide and about 10 centimeters thick. The surface is uneven and grayish green in color. There are several tags consisting of soft pliable tissue attached to the surface. The mass is riddled with holes of various sizes from which escapes thick yellowish-green intensely foul-smelling pus. After the pus has been washed out, a spongy formation remains which is made up of a homogeneous fibrous material. The consistency is quite firm and on the cut surface the color is grayish white with less distinct whitish striations running in different directions. There are a few darker areas the consistency of which is less than that of the surrounding tissue.

Under the microscope the structure of the tissue is still recognizable. Bundles of elongated, homogenous fibers interlacing in various directions and staining deeply red with eosin, are separated by a paler stained homogeneous tissue. In the bundles there are either no nuclei at all, or here and there faintly stained fragments are visible. In several places the course of these bundles seems to be interrupted by irregular granules which take an intensely blue hæmotoxylin strain; sometimes these masses are less distinct and appear pale blue. A Sudan III stain reveals a large amount of fat droplets within and around these bundles. Around the bluish stained granules are found the larger accumulations of fat droplets. Surrounding the holes described in the macroscopic examination are found numerous well stained polymorphonuclear leucocytes invading the tissue. In these places the bundles of fibres have disappeared and a mesh work of connective tissue between the cells can be recognized. Smears of the pus from the specimen showed bacillus coli and staphylococci.

Diagnosis. Necrotic fibromyoma with fatty degeneration and beginning calcification and localized suppuration.

This patient apparently had an intramural fibroid which took on growth during pregnancy, because of the increased blood-supply. As gestation progressed, it became flattened and elongated and during the last weeks necrobiotic changes set in. With the retraction of the uterus, the tumor was compressed and some of the toxins from the necrotic process were forced into the circulation and a chill occurred. At the time of each chill there was more absorption. Whether the further changes, that is, the suppuration and sloughing were due to infection introduced at the time of the application of the forceps or the intra-uterine exploration, is a question; but due aseptic care was exercised in all manipulations. However, the mucosa over the fibroid was traumatized and micro-organisms entered in some way and produced a subcapsular suppuration which is the etiological factor in the enucleation of this fibromyoma from the uterine wall. The subcapsular suppuration was an infection of a subcapsular hæmatoma, which undoubtedly occurred during labor. The contractions tore the capsule loose from the surrounding uterine musculature and bleeding followed. Finally, the uterine contractions aided in the partial expulsion of the suppurating fibroid. The endometrium was involved in the suppurative process and this suppuration was responsible for the destruction of the endometrium and hence the cessation of menstruation.

It is the opinion of Dr. Jaffé after carefully examining the microscopic sections, that the retrogressive changes are not of more than 4 or 5 weeks' duration, as there are many strands of muscle tissue in fairly good condition, many fragments of nuclei, and only a moderate degree of fatty and hyaline changes with little calcification. So that these changes may have been initiated during the last days of her pregnancy.

As far as I could find, there is no other case in the literature in which a definitely palpated

interstitial fibroid was spontaneously separated from its uterine wall attachments in the puerperium and subsequently partially expelled.

CONCLUSIONS

1. Fibroid tumors in the puerperium may cause serious complications, frequently a febrile course.

2. Fibroid tumors themselves may suffer changes during gestation and labor and these may progress and even be augmented by secondary infection during the puerperium.

3. When a woman with a fibromyomatous uterus becomes pregnant and goes to term, cæsarean section with an immediate myomectomy or hysteromyomectomy is the operation of choice.

4. When the myoma is not discovered until during labor or in the puerperium, conservatism should be practiced as long as possible.

I wish to acknowledge my indebtedness and express my appreciation to Dr. R. H. Jaffé, Director of the Uehlein Research Laboratories of Grant Hospital of Chicago, for valuable assistance in the examination of the specimen.

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DEPARTMENT OF TECHNIQUE

LOCAL ANÆSTHESIA OF THE ABDOMINAL SYMPATHETIC SYSTEM[1]

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THE writer feels that the use of local anæsthesia in abdominal surgery has not been as extensive as its advantages seem to warrant. The tendency has been to confine its use to the types of cases in which general anæsthesia is contra-indicated. During recent years, and more particularly in this country, surgeons have employed it more extensively. Some of the reasons for the curtailment of its use and the widespread opinion that it is unsatisfactory in most types of abdominal surgery will be discussed in the following pages. In addition an effort will be made to demonstrate methods which, if applied consistently, offer an opportunity for a broader application of local anæsthesia in abdominal surgery.

The advantages of the method are legion, but in this message these will be referred to only incidentally as the writer will occupy the time at his disposal mainly with a discussion of the following important considerations:

1. A review of the literature of the past 4 years made in an effort to ascertain the attitude of those well versed in the use of local anæsthesia toward the facility with which the method may be used in abdominal surgery.

2. An effort to analyze the reasons for the apparent lack of enthusiasm on the part of some of these writers.

3. A summary of the alleged objections to the use of local anæsthesia in abdominal surgery, based upon a review of the literature, the discussions before medical associations, and upon conversations with and observations of large numbers of clinicians.

4. An outline of a more comprehensive terminology of local anæsthesia.

5. A discussion of the general factors influencing the application of local anæsthesia to abdominal surgery.

6. A description of the technique used by the writer in establishing anæsthesia of the *thoracic* and *sympathetic nerves* by which the use of local anæsthesia in abdominal surgery may be greatly simplified and facilitated.

QUOTATIONS FROM THE LITERATURE

The statements of such men as Haertel, Sherwood-Dunn, Allen, Labat and his student Meeker of the Mayo Clinic, Harris, Finsterer and Braun may, I think, be used as a basis for "taking stock" of the present status of the subject.

Sherwood-Dunn, whose monograph appeared in 1920, shows a preference for intraspinal anæsthesia " . . . for major intra-abdominal operations upon the liver, stomach, intestines, and pelvic organs." He prefers regional anæsthesia " . . . in cholecystostomy . . . for appendectomy when the acute attack has subsided and provided the appendix and cæcum are free from adhesions. . . . For the performance of major upper abdominal operations paravertebral anæsthesia injected in such a manner as to reach the abdominal sympathetics is necessary," and he says that in order to anæsthetize for "hysterectomy, fibroids of salpingitis, one must inject 12 pairs (of nerves) on each side . . . six lower intercostals, three lumbar and three sacral." He further states that in these conditions he prefers lumbosacral anæsthesia.

Thus this surgeon would limit the use of simple local anæsthesia to cholecystostomy and to the removal of the interval appendix which is free from adhesions, excepting when applying paravertebral anæsthesia, by a technique which insures anæsthesia of the sympathetic system. Most authors agree that this method is wellnigh impossible to carry out and even those favoring *simple*

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paravertebral anæsthesia admit its many drawbacks. He prefers intraspinal anæsthesia and his book presents little encouragement to surgeons to use local anæsthesia in this field.

In the last edition of Allen, which appeared in 1920, he states: . . . "Any operation with any certainty of success by purely local means must be limited to those parts which are in contact with the abdominal wall or are readily accessible, and can be operated on without undue manipulation or traction. In the presence of acute *inflammation, extensive adhesions* or when the diagnosis is *at all in doubt*, local anæsthesia is not indicated." He further states: "All simple operations such as gastrotomy, colostomy, appendectomy and gall-bladder drainage are quite satisfactorily performed . . . when the parts are fairly accessible and not matted down by inflammation or adhesions to parietal peritoneum or surrounding organs; consequently, only such operations should be undertaken when it is *known beforehand* that favorable conditions exist." [1]

He recommends abdominal exploration when using local anæsthesia, by the method of insinuating the hand into the abdominal cavity and says: "Local anæsthesia is not the method for routine work within the abdomen . . . If on exploring through a mid-line incision an appendix or diseased gall bladder is encountered, separate incisions should be made over these parts rather than attempt to displace them toward the mid-line."

He excludes "as a general rule all very stout individuals and those with tense rigid abdominal walls, for as soon as the abdomen is open the contents bulge out and as any extensive packing back or the use of deep retractors excites pain, the difficulties are at once increased by the straining which these procedures bring on." He states further: ". . . In thin subjects with relaxed abdominal walls operations of considerable magnitude may *at times* be performed. . . . In such subjects it is usually possible to slip two fingers or a long narrow retractor down and expose the retroperitoneal tissues for infiltration. . . . The introduction of local anæsthesia in the neighborhood of the solar plexus is *always* difficult in *favorable subjects*, only possible in the hands of those who have had much experience with local anæsthesia methods within the cavity." He takes the position that removal of the appendix in the presence of inflammation or extensive adhesions is *never* suitable for local methods alone. Extensive gall-bladder disease with stones in the cystic or common duct he also considers unsuitable for the use of local anæsthesia. While stating that cæsarean sections can be quite readily performed under local anæsthesia he feels that this method should be used only when general anæsthesia is contra-indicated.[2]

Allen's dictum that local anæsthesia should not be used when there is a possibility of adhesions being encountered or in the presence of fat or rigidity removes from the field a considerable proportion of cases in which we believe local anæsthesia can be used with success. Contrary to his opinion we have almost never been compelled to make a separate incision and rigidity disappears under perfect local anæsthesia. Bulging out of the abdominal contents is unusual. His reference to the use of deep retractors and extensive packing and his advice that the inflamed appendix or gall bladder preclude the possibility of using local anæsthesia are almost entirely at variance with our experience in abdominal surgery. The fact that for more than 10 years we have used local anæsthesia in over 90 per cent of our gall-bladder cases regardless of the type and in over 97 per cent of our appendix cases regardless of the stage of the disease or the age of the patient, should be sufficient evidence why we cannot agree with this author.

Labat in his book published in 1922 in discussing splanchnic anæsthesia by the anterior route states: "The method of Braun and Pauchet . . . can be used with advantage only after a mid-line incision and in the absence of such pathological conditions of the stomach, liver, and gall bladder as would permit of free exposure of the lesser omentum. A distended stomach stands too much in the way; so does a stomach adherent to the pancreas or the liver *et fortiori* to both organs."

[1] Italics mine.

[2] Italics mine.

This author uses almost the exact words of Allen when he states: "These procedures are, besides, very difficult in certain cases. In stout individuals, with tense rigid abdominal walls, as soon as the abdomen is opened the contents bulge out and even the packing back is not an easy task. In thin, relaxed patients it is usually possible, when gentleness is used, to slip two fingers in opening the way for the needle to the solar plexus or to the retroperitoneal tissue in its vicinity, care being exercised in the neighborhood of the large vessels. Even under the best conditions the technique is only possible in the hands of those who have acquired much experience with local methods within the abdomen."

He states that splanchnic anæsthesia by the posterior route of Kappis, Naegli, or his own should be given preference no matter what technique is employed.

With regard to paravertebral block he states: "it does not widen the scope of operations capable of being performed by means of the field block procedure," and he considers that the possibility of danger of paravertebral block militates against its use for laparotomy only and preference is given to the field-block procedure.

When recommending local anæsthesia for cæsarean section and cholecystostomy he prefers the use of the direct infiltration method to that of regional anæsthesia or field block. He now prefers the procedure which he calls "field block" or "infiltration block" as used by the writer to paravertebral as it is much more easily accomplished and ". . . requires no especially long and delicate training as does paravertebral block." This author admits that paravertebral block is difficult, long, and tedious, tiring to the patient and that it is not quite as safe as other procedures considering the enormous dose of novocain required to produce anæsthesia. He makes the further significant statement that intraspinal block is easier, quicker, and *safer*.[1]

Another reason given by Labat for using intraspinal in preference to paravertebral anæsthesia is because, when using it, the condition which the writer many years ago designated as "negative intra-abdominal pressure" cannot be obtained. His advice regarding the making of abdominal explorations duplicates that of Allen when he says: "The abdominal organs may be explored, provided the incision is long enough to allow the hand to steal into the abdominal cavity without force." The result of his experience in this regard becomes manifest when he states that some patients require just enough ether or gas to make them lose consciousness during this stage of the operation.

He refers repeatedly to the tendency of the *bowels* to *bulge out* as soon as the abdomen is opened. In dealing with the appendix he recommends that in cases in which the cæcum cannot be brought to the *level* of the *surgical wound* it is preferable to give first stage inhalation narcosis. He says: . . . "The *injection* of the *meso-appendix* does *not amount* to *much* in abolishing painful sensation but recommends such injection *as soon as the appendix is brought out between the lips of the wound.*"[2]

With regard to ovarian cysts his experience is reflected when he says: "Its pedicle is infiltrated before ligation or a few whiffs of ether or gas administered before this stage of the operation."

He states: "The induction of anæsthesia for abdominal operations is *very difficult* and requires *long practice.*" He reaches the conclusion that *intra-spinal* anæsthesia is the *anæsthesia of choice in fat patients.*[2]

Regarding toxicity, he says: "The use of one-half pint of 1 per cent solution is absolutely dangerous." The same author, while objecting to infiltration anæsthesia, states: "If the solution is distributed to the structures of the body to be cut through or excised *direct infiltration* is *extremely safe* because the greater part of the injected fluid escapes when the incision is made."[2] He considers this one of the most potent reasons why direct infiltration should be used whenever possible.

He advises a delay of 5 minutes or more after the induction of the anæsthesia before beginning the operation even when "field block" is used.

It is interesting to note that this author's attitude has been completely reversed in re-

[1] Italics mine.

[2] Italics mine.

gard to paravertebral anæsthesia since his arrival in this country 3 years ago.

The contrast between his writings and those of Sherwood-Dunn (both of whom were associated with Pauchet) in relation to paravertebral anæsthesia and their agreement that intraspinal is safer and, in fact, the anæsthesia of choice for intra-abdominal work are most significant. Labat's statement that it is necessary to bring the cæcum out of the abdomen and that anæsthesia of the meso-appendix is ineffectual does not tally with our experience.

Our viewpoint differs radically from his. We have, in hundreds of cases, reproduced the patient's original appendiceal colic by making pressure or traction on the meso-appendix. We have invariably been able to abolish this colic by a thorough infiltration of this tissue. This experience has led us to the routine procedure of blocking the meso-appendix or even the mesocæcum *before* attempting its elevation and before placing clamps. In no instance do we consider it an absolute essential to "raise the cæcum or appendix to the level of the surgical wound in order to deal with it." Here *surgical strategy* effectually offsets the exigency which Labat considers sufficient demand for inhalation anæsthesia.

The reason given that local anæsthesia be excluded in large herniæ so obviously ignores the value of a condition of "negative intra-abdominal pressure" and coincides so well with the statement appearing frequently in his book that upon opening the abdomen the contents "bulge out," that it would seem that more propaganda along this line is indicated.

He condemns the use of anterior sympathetic anæsthesia so unqualifiedly in favor of the posterior route of Kappis as to make abdominal surgery appear possible only in the hands of the most expert. In the mind of this author, whose monograph has been published so recently, the apparent difficulty and impracticability of carrying out this procedure is so manifest that it is not surprising to find the opinion prevalent among his followers that a degree of skill is required the acquisition of which is discouraging.

The advice to administer gas in order to ligate the pedicle of an ordinary ovarian cyst does not coincide with our experience, nor can we agree that the induction of anæsthesia for abdominal operations is very difficult and requires long practice.

It is encouraging to note that he has abandoned paravertebral anæsthesia for infiltration of the abdominal wall and that he admits that direct infiltration is the method of choice in some instances and the safest in all.

Meeker and Bonar in SURGERY, GYNECOLOGY AND OBSTETRICS in December, 1923, practically the latest contribution upon this subject, make a number of statements which are so significant that it seems well worth while to quote them. They state that parametric infiltration carried out through the vagina has been very little employed except by Ruge, stressing the possibility of perforating the rectum, bladder, or coils of intestine and the dissemination of septic foci with the needle. In regard to abdominal pelvic operations, their viewpoint is well illustrated by the following quotation: "In operating within the abdominal cavity, only a limited number of gynecologic operations are feasible and only then under very favorable conditions, such as *thin relaxed abdominal walls*, no *acute inflammation* or *pelvic adhesions*, but *free mobility of the parts*."[1] Quoting further, "no packing of the abdominal cavity can be performed, no breaking up of adhesions nor grasping of the uterus with volsellum or other toothed instruments unless the points at which they are applied have first been infiltrated. . . . For the more extensive abdominopelvic operations, however, particularly *hysterectomy, general narcosis* is necessary for the intra-abdominal work.[1] The addition of transsacral nerve block and even the supplementing of this procedure by lumbar paravertebral nerve block does not solve the problem." They further state that infiltration sufficient for abdominal hysterectomy "has been accomplished in only a few very favorable cases by men of the widest experience in the handling of local anæsthesia problems, the thorough and comprehensive work of Farr constituting the only notable exception to this statement." They conclude

[1] Italics mine.

their discussion of this phase of the problem as follows: "For most surgeons of wide experience local anæsthesia by whatever method induced, does not create an operative condition compatible with the employment of the appropriate surgical methods which are indicated in most abdominopelvic operations."

Quite obviously the statements of Meeker and Bonar may be said to reflect the present attitude of the Mayo Clinic in relation to the scope of local anæsthesia (December 22, 1923).

With regard to the danger of the parametric injection which should, of course, not be used in the presence of sepsis or suspected malignant disease, the literature shows nothing deprecatory to local anæsthesia.

Regarding the opportunity offered by local anæsthesia for the performance of pelvic operations the writer might quote the statement of Dr. L. L. McArthur to whom he recently had the pleasure of demonstrating the use of the method in this field. This surgeon stated that in an experience of 40 years he had not observed such an excellent opportunity for the performance of an abdominopelvic operation under any form of anæsthesia as that presented. Incidentally it might be stated that the patient shown was fat, extremely nervous, and had previously been subjected to two local anæsthesia operations without success. If the statements of Meeker and Bonar may be said to reflect the facts, even approximately, the use of local anæsthesia in this region must certainly be limited. By way of contrast, the writer's experience over a period of 16 years with parametric infiltration without an accident of any kind, and his completion of over 90 per cent of abdominopelvic operations during the past 10 years under the local anæsthesia method make the conclusions of these authors seem more or less premature.

In contrast to their opinions those of Harris, Finsterer, Braun, and Haertel are most significant. In addition, the opinions of hundreds of surgeons with whose work the writer is familiar, go to show that abdominopelvic operations of almost every variety may be performed painlessly under this method.

It is gratifying to note the position taken by Harris, an excellent surgeon and a man of wide experience in the use of local anæsthesia, who in *Oxford Surgery*, 1923, says: "Many of the organs are not sensitive to ordinary trauma so that much operative work may be done without pain by simply blocking the abdominal wall. . . . The abdomen may be opened and its contents thoroughly explored without pain. . . . One may do a great deal of work in the abdomen under local anæsthesia in the most satisfactory manner."

Finsterer in his book, *Anæsthesia in Abdominal Surgery*, 1923, states that the chief dangers of every major operation are the effects of general anæsthesia or its results. He says of paravertebral anæsthesia ". . . it is very unpleasant to the patient on account of the 20 needle punctures and the relatively large doses of novocain are not harmless. I have never considered paravertebral anæsthesia the method of choice in gastric resection. It is more dangerous than the other methods of conductive anæsthesia . . . it will never become the method of choice. . . . It has been more or less abandoned."

Finsterer claims that gastric dilatation is of rare occurrence after the use of local anæsthesia, and that the absence of intestinal atony greatly reduces the liability to postoperative peritonitis.

In relation to the anterior splanchnic anæsthesia of Braun, he states: ". . . By introduction of the needle the patient occasionally experiences pain which demands a slight amount of ether."

Braun's experience seems in accord with that of Finsterer and yet this author allots only 10 pages of his recent book to the surgery of the abdomen exclusive of that of the abdominal wall. Labat, Kappis, and others believe that the posterior splanchnic is superior to Braun's method of obtaining intraperitoneal anæsthesia.

In personal visits to large numbers of clinics the writer found that the limitations placed upon local anæsthesia by the writers quoted above are accepted to a great extent by a majority of surgeons. Likewise teaching institutions and surgeons of the highest rank seem as a rule to be less impressed with the local anæsthesia method than are surgeons who are not so widely known.

It is obvious that this belief would not be so widespread if a method could be developed of obtaining anæsthesia within the abdomen which even approximated that possible in the abdominal wall. It is the writer's conviction that the method about to be described will make it possible for the average surgeon to perform a considerable percentage of his abdominal operations under this *régime*.

SUMMARY OF THE ALLEGED OBJECTIONS TO THE USE OF LOCAL ANÆSTHESIA IN ABDOMINAL SURGERY

An attempt to summarize the alleged objections to the use of local anæsthesia in abdominal surgery has resulted in a grouping together of the following factors which, singly or combined, are considered reasons for its avoidance:

Rigid abdominal walls, excessive fat, the time required and the irksomeness of introducing the solution, failure to obtain a "negative intra-abdominal pressure," the presence of visceroparietal and visceroviscəral adhesions, the difficulty of making abdominal explorations, the impossibility of returning viscera from hernial sacs into the abdominal cavity, the danger of introducing the required amount of solution, acute inflammation, the difficulty of gaining exposure, interference with wound healing, psychic incompatability of the patient, the special tax placed upon the surgeon's endurance, the difficulty of learning the method and teaching it to others, the presence of pathology which is not readily accessible, and a host of other factors are mentioned.

While these objections are more or less tenable in some instances, the writer is convinced that there are means at hand, at the present time, to meet and overcome almost all of them provided the *local anæsthesia technique* and *surgical technique* applied are according to the plan outlined below.

In the writer's opinion the following factors offer the most difficulty:

1. Lack of co-operation on the part of the patient. This is met only occasionally and becomes infrequent as the patients learn that these operations may be painlessly and successfully performed.

2. The presence of acute inflammatory processes. Such patients may offer great difficulties but a considerable percentage of them may be treated with success after a certain degree of skill and experience is developed.

3. Distention of the intestines. In many instances the second and third factors are combined. Careful packing and retraction, combined with evisceration and enterostomy when indicated, will often meet the requirements. As a rule the more difficult the case the more urgent is the demand for local anæsthesia.

4. Deep or posterior adhesions. These may preclude the possibility of completing an operation. However a good exposure, sharp dissection, careful packing, and the employment of intraperitoneal anæsthesia will meet the indications in a fair percentage of cases.

5. Large tumors with short pedicles (fibroids or carcinomata). Occasionally a large solid tumor may so obstruct the operative field that the necessary *exposure* cannot be obtained and in such an event, if it can be anticipated, posterior splanchnic (Kappis), transsacral (Pauchet), or parametrical anæsthesia may be used as a preliminary to laparotomy.

6. Persistent nausea and vomiting. Once in a while a patient will become nauseated during an operation even though sharp traction is not employed. In our hands this is a more common indication for general anæsthesia than is pain. In case fresh air and cold cloths applied to the forehead do not overcome this condition, psychic ether seems to meet the indications best. If necessary this may, of course, be carried on to complete narcosis.

A DEFINITION OF TERMS

Before proceeding further it may be well to call attention to a certain confusion of terms which is evident upon visiting clinics and medical conventions and observing and listening to surgeons. The method of Crile, for example, is often referred to as "local anæsthesia," while quite obviously it is "mixed anæsthesia." Also many operations begun under local anæsthesia and completed under general anæsthesia are reported and

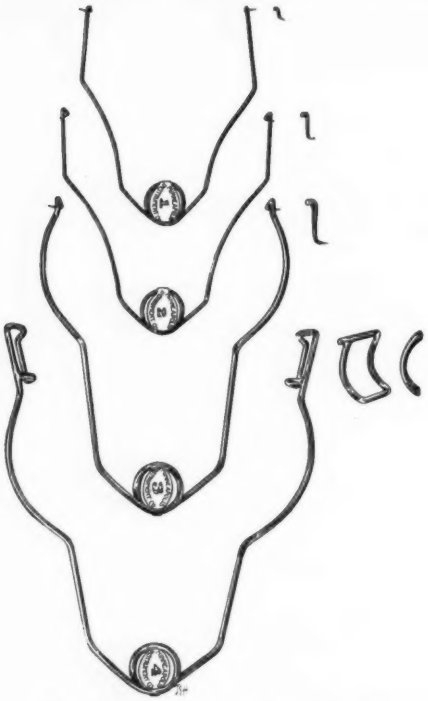

Fig. 1. Automatic wire spring retractors.

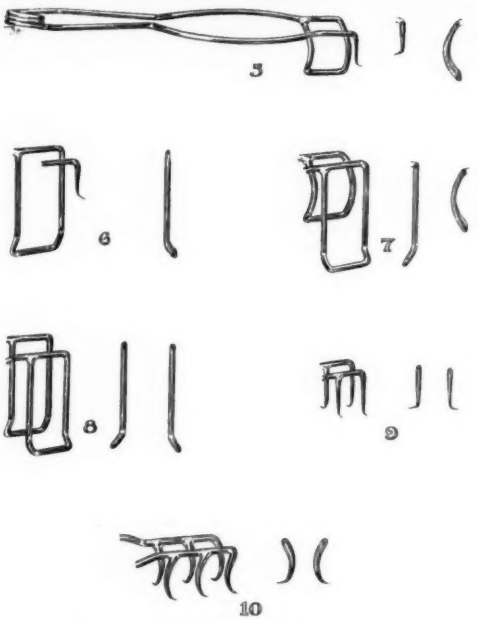

Fig. 2. Automatic wire spring retractors.

referred to as "local anæsthesia" operations. Likewise many patients are operated upon under local anæsthesia who are so deeply narcotized by preliminary hypodermic medication ("twilight sleep" or "narcolocal anæsthesia") that the local anæsthesia employed plays only a minor rôle. Other cases are operated upon with local anæsthesia who complain so bitterly that it is a gross misdemeanor to employ the term "anæsthesia" at all.

The writer takes the position that only cases carried through to their completion without curtailing the operative procedure and without pain to the patient should be recorded as operations under "local anæsthesia." Others should be designated as "mixed," "narco-local," "unsatisfactory," "failures," or "psychic," anæsthesia. Furthermore, the *operating room performance* of a surgeon should be made to *coincide* with his public *discussion* and *writings* and vice versa. If this ideal could be maintained it would be much less difficult to evaluate the opinions of various surgeons who speak and write upon this subject.

GENERAL FACTORS WHICH INFLUENCE THE USE OF LOCAL ANÆSTHESIA IN ABDOMINAL SURGERY

Who shall administer the anæsthetic? A point that cannot be too strongly stressed is the fact that local anæsthesia may be applied to abdominal surgery with a far greater degree of success by the surgeon who does the operation, than by the method now being attempted in a few clinics in this country. The reason is obvious. Successful use of local anæsthesia in abdominal surgery often demands the introduction of the solution at successive stages of the operation by one who is in a position to deliver the proper amount to the indicated areas at the proper time. In fact, anæsthetizing new areas becomes an actual integral part of the operation and no one but the surgeon can anticipate the demands of a given case and

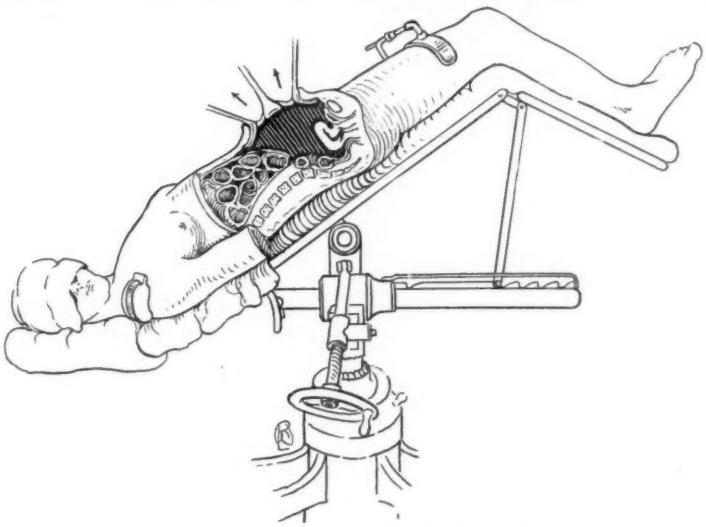

Fig. 3. Negative intra-abdominal pressure resulting from perfect anæsthesia of the abdominal wall and the position of the patient. (From *Practical Local Anæsthesia*, 1923).

precede his maneuvers by the adequate introduction of the solution and at the same time so regulate his manipulations as to coincide with the effect of the anæsthesia given. In some regions of the body in which complete areas may be anæsthetized as a preliminary to operation the other method may be applied with more satisfaction but in abdominal surgery local anæsthesia has not yet reached the stage where this may be done. In abdominal surgery only intraspinal anæsthesia meets this demand and the writer feels that until this method has been proven more safe than general anæsthesia it cannot be recommended as a local anæsthesia method.

INTRAPERITONEAL ANÆSTHESIA

Although it is many years since experts in the use of local anæsthesia began to develop methods of obtaining intraperitoneal anæsthesia, surgeons have, as a rule, failed to make use of this most important factor. The indications for the use of local anæsthesia in this field must obviously be dependent upon the possibility of its satisfactory use. In other words, the scope of the local anæsthesia method for the individual operator must depend upon the satisfaction with which the indications may be met. Among other things, the personal equation plays an important rôle in the establishment of these indications.

The writer's viewpoint in regard to the indications and scope of the carrying out of intraperitoneal procedures under local anæsthesia is such that he feels that it may be worth while to enumerate in more or less detail the means by which the method may be applied in intraperitoneal surgery.

The introduction of more simple methods of inducing anæsthesia, improvement in equipment and a more clear-cut realization on the part of surgeons that many factors aside from the anæsthesia technique, i. e., the method of meeting the surgical indications, an all-round improvement in the psychic care of the patient, improved diagnosis, properly chosen incisions, and above all the induction of anæsthesia and the performance of the operation (without the production of pain or the reflex contraction of the muscles) have been the means of bringing to many surgeons a realization that the abdomen is a fertile field for the use of local anæsthesia.

FACTORS WHICH INFLUENCE THE USE OF LOCAL ANÆSTHESIA IN ABDOMINAL SURGERY

With all of the above requirements met and the abdomen opened under anæsthesia which has not only prevented pain but has eliminated the reflexes of the abdominal muscles as well—the *latter requiring greater refinement of technique than the comparatively simple prevention of pain*—the successful completion of the operation will depend upon two factors, namely, surgical strategy and anterior splanchnic or sympathetic anæsthesia.

Surgical strategy must be directed entirely toward obtaining an adequate exposure without the production of pain or the dreaded positive pressure or expulsive effort. Obtaining the proper exposure offers the surgeon the opportunity for the establishment of anæsthesia of the sympathetic system after which practically any operative procedure within the abdomen can be carried out.

ANÆSTHESIA OF THE ABDOMINAL WALL

All complicated methods are excluded and direct infiltration, unless contra-indicated, is the method of choice. Routinely the abdomen is opened in such a manner as to meet the indications mentioned above. The walls of the incision are retracted or stretched by means of wire spring retractors (Figs. 1 and 2). The field is placed at the highest possible level by tilting the operating table and all movable viscera are allowed to fall to lower levels (Fig. 3). A stout, smooth retractor (Fig. 4) is used to elevate any desired segment of the abdominal wall and a visual examination is made. This may be supplemented if necessary by palpation with the fingers. All adhesions presenting will hang like bunting from a ceiling and may be severed (Fig. 4). Through the psycho-anæsthetist the co-operation of the patient is utilized, the control of the respiratory function being of the utmost importance. Straining, coughing, sneezing, or laughing are to be avoided.

WRITER'S METHOD OF OBTAINING INTRAPERITONEAL OR SYMPATHETIC ANÆSTHESIA

The posterior method of Kappis we use but rarely. We have had no experience with the anterior method of Wendling. The method which we employ is a modification of that suggested by Braun as we have found his technique a not uncommon cause of severe pain. Seidel and Barouch have recommended the introduction of large quantities—up to 600 cubic centimeters—of a 1 per cent novocain solution into the free abdominal cavity. Our experimental work on animals leads us to believe that this method would be extremely dangerous.

We agree with Seidel and Finsterer that it is less difficult to anæsthetize the splanchnic area directly in the field of operation than to try to reach separately all of the branches which supply it paravertebrally. It is an established fact that the sympathetic nerves accompany the vessels as a rule and this fact may be taken advantage of in inducing intraperitoneal anæsthesia. The large arteries supplying the stomach, colon, small intestine, spleen, or uterus may be used as a guide in establishing anæsthesia. The greater, lesser, or pelvic sympathetics may be reached through their ganglia or their immediate branches.

In obtaining anæsthesia within the abdominal cavity it is our custom therefore to expose the area in which anæsthesia of the sympathetic system is to be established prior to its induction. The tissues carrying the nerves to the stomach, spleen, pancreas, colon, small intestine, appendix, and pelvic viscera are accessible in the vast majority of cases and though intraperitoneal anæsthesia is by no means always necessary it can usually be established when required, provided strategy is employed. As stated we have almost universally found the introduction of the fingers and retractors for the purpose of palpating the large vessels and the vertebral bodies so that the needle might be introduced by the guidance of the finger alone a cause of considerable complaint on the part of the patient. (Braun, Allen, Labat, Finsterer and others agree that it is not unusual when attempting this method to be compelled to give inhalation anæsthesia on account of the pain produced.) Introducing the solution retroperitoneally under direct vision is therefore the method we have developed and advise.

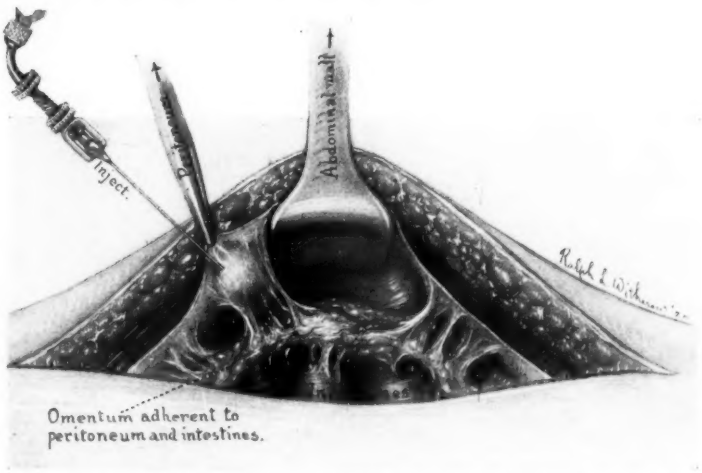

Fig. 4. Visceroparietal adhesions. Vertical retraction. Negative pressure. Local infiltration at the point of attachment. (From *Practical Local Anæsthesia*, 1923.)

The regions aside from the greater splanchnic area which may be reached between the liver and the duodenum and the pelvic sympathetics at the pelvic brim are the mesenteries of the large and small bowel—always in close proximity to the large vessels (superior and inferior mesenteric and their branches)—the splenic pedicle, the mesoappendix and the round and broad ligaments (Figs. 5 and 6).

Exposure is the key to success, visceroparietal and viscerovisceral adhesions may be severed without producing pain. Gentle lateral and vertical retraction as illustrated (Fig. 4) will make it possible to deliver the required solution to the appropriate points directly under the vision. The peritoneal surface may be observed as it swells under the pressure of the injected fluid and there need be no fear of introducing the solution into the circulatory system. The most important region, i. e., the one by which peritoneal sensation is most largely governed, lies between the duodenum and the liver. This space may almost always be exposed, provided the stomach is empty and extensive inflammatory or malignant disease is absent, by methodically carrying the duodenum downward, the liver upward, the stomach to the left and the contents of Morris' pouch to the right (Fig. 7). The falciform ligament and the gastrohepatic omentum may be drawn toward the left shoulder. It should not be forgotten that the round ligament of the liver is one of the most sensitive tissues in the abdominal cavity and should be thoroughly and deeply infiltrated as soon as the upper abdomen is opened. Likewise all anterior parietal peritoneum should be rendered anæsthetic by a subperitoneal infiltration throughout the area with which contact is to be made.

After opening the abdomen retraction becomes the most important factor in gaining the exposure upon which the induction of the sympathetic anæsthesia depends. Rigid, forceful, uneven, or asymmetrical retraction will almost invariably bring about the dreaded expulsive effort on the part of the patient and bring from the surgeon's lips the remark: "Just at this stage I like to give the patient a little general anæsthesia." On the other hand the consistent use of flexible, mild, elastic, symmetrical, continuous lateral and vertical retraction developed stealthily and combined with the utilization of the force of gravity, which is dependent upon the proper tilting of the operating table into the desired plane by means of the worm drive, will almost invariably present to the surgeon's view the sympathetic ganglia or trunks which supply

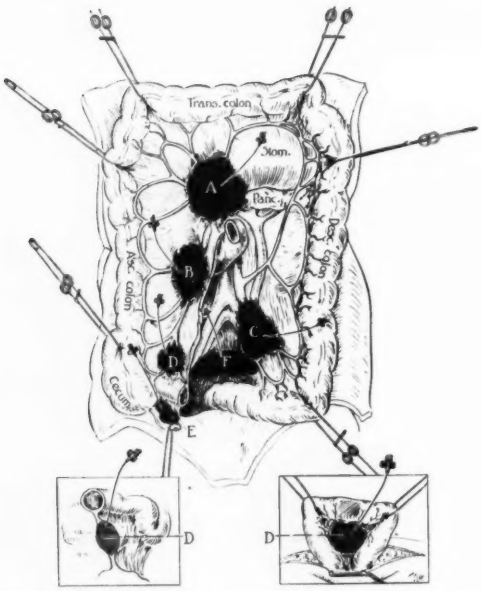

Fig. 5. Local Anæsthesia of the abdominal sympathetic system. *a*, Mesentery of the transverse colon; *b*, mesentery of the ascending colon; *c*, mesentery of the descending colon; *d*, mesentery of the small intestine; *e*, mesentery of the appendix; *f*, pelvic sympathetics.

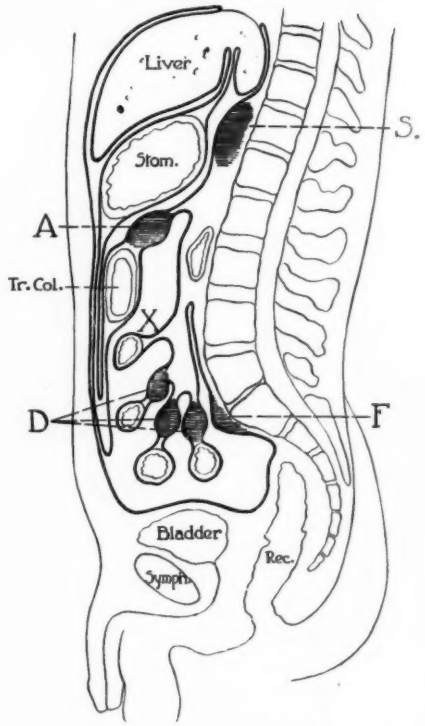

Fig. 6. Local anæsthesia of the abdominal sympathetic system, sagittal view. *X*, Normal mesentery of the small intestine; *S*, greater splanchnic area; *A*, mesentery of the transverse colon; *D*, mesentery of small intestine; *F*, pelvic sympathetics.

the area to be attacked surgically (Figs. 3 to 5 and 7).

This area may be superficial or deep depending upon the pathology, the proportions of the patient or the region involved. When not readily accessible, equipment becomes, for the moment, the all-important consideration. Anæsthetizing the pelvis of a stout individual, the solar plexus or the flexures of the colon, may demand an extreme degree of strategy as well as adequate equipment. Here the cut-off of the pneumatic injector (Fig. 7) which may be used without obstructing the surgeon's view, unquestionably shows its superiority over the syringe and not infrequently makes possible the establishment of intraperitoneal anæsthesia under circumstances in which it would otherwise be necessary to administer inhalation anæsthesia. The possession of equipment such as artificial light, elastic retraction, and a table which may be tilted into the desired plane without discomfort to the patient by means of the worm drive so that the force of gravity may be utilized, not infrequently becomes the deciding factor between the completion of the operation under local anæsthesia or recourse to inhalation anæsthesia.

The operative procedure having been decided upon, anterior sympathetic anæsthesia should be established as indicated. For the purpose of illustration the technique of cholecystectomy may be described: a strip of gauze is laid over the pylorus and a loop of a No. 6 retractor (Fig. 7) gently forces it to the left. Another carries the duodenum downward while a third carries the colon and omentum found in the pouch of Morris to the right. The surgeon may now step away from the operating table and have the satisfaction of seeing the patient, at the suggestion of the

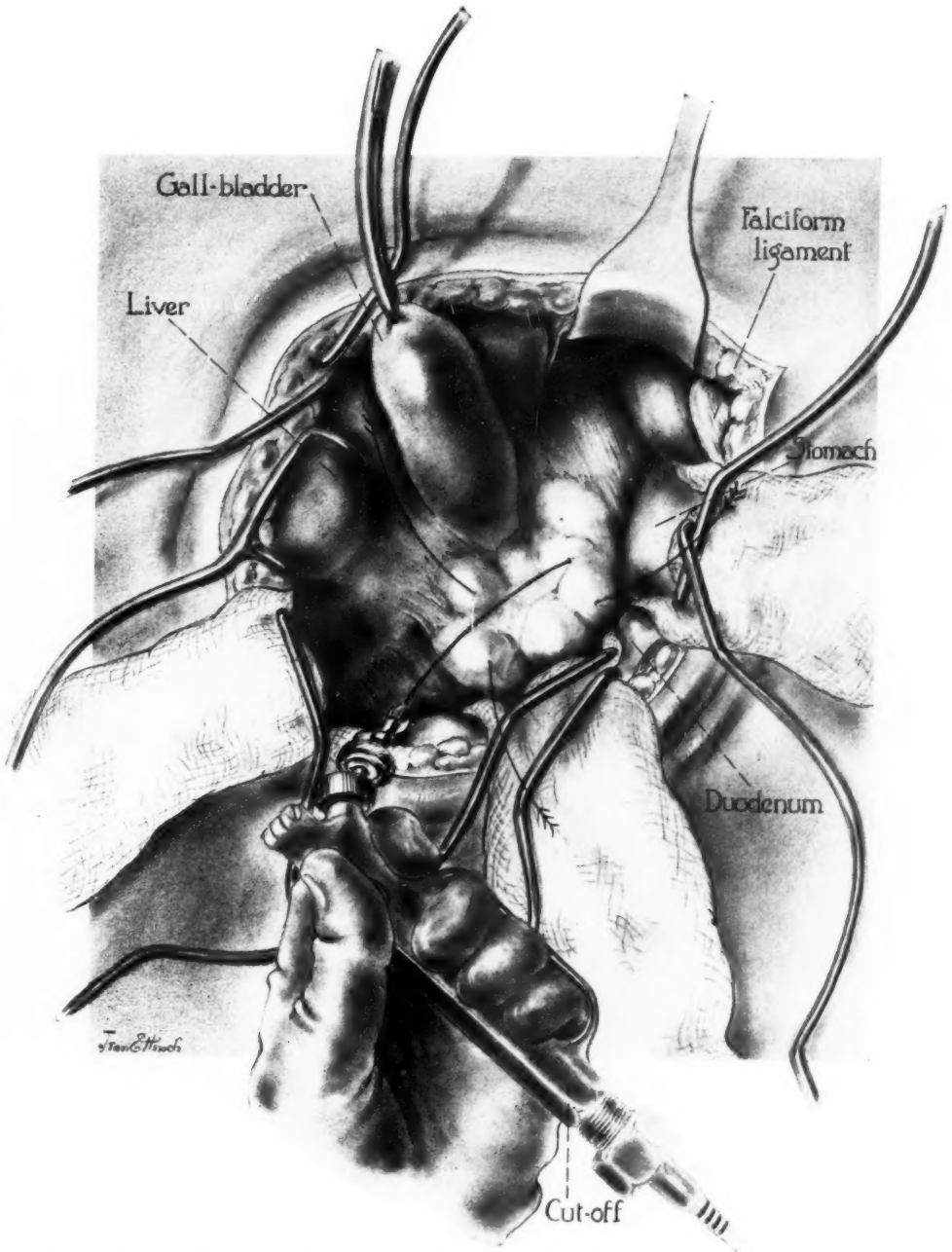

Fig. 7. Local anæsthesia for cholecystectomy. Anæsthesia of the greater splanchnic area, surface view.

psycho-anæsthetist, extrude his gall bladder and the edge of the liver well outside the abdominal wall by inhaling deeply. A smooth retractor draws the lower edge of the liver upward exposing the hepaticoduodenal pouch. By introducing the needle through the peritoneum this area may be completely anæsthetized. If the exposure is made in this manner this step may be done without pain (Fig. 7).

CONCLUSIONS

In conclusion the writer would reiterate the following facts:

Local anæsthesia possesses many advantages when applied to intra-abdominal surgery.

Many of the objections to its use are based upon its improper application.

Anæsthesia methods should be simplified as much as possible and the surgeon who essays the use of local anæsthesia should possess appropriate equipment and sufficient training to enable him to administer his own anæsthetic.

The term "local anæsthesia operation" should be used to signify only operations which are carried to their completion without curtailment and without pain or the addition of other drugs.

With an exhibition of the appropriate technique, complete anæsthesia may be painlessly established for the performance of a vast majority of abdominal operations.

And finally, the consistent use of local anæsthesia in this field demands adequate equipment and an adherence to fundamental principles, the most important of which are the psychic preparation of the patient, a painless induction of the anæsthesia of the abdominal wall, elastic retraction, exposure which allows the establishment of intraperitoneal anæsthesia and a surgical technique compatible with the best interests of the patient.

THE RADICAL CURE OF HÆMORRHOIDS BY THE CLAMP AND CAUTERY METHOD, EMPHASIZING THE VALUE OF SACRAL ANÆSTHESIA

A Study of Six Hundred Consecutive Cases with but One Death

By PARKER SYMS, M.D., F.A.C.S., New York

WHILE I have but little that is new to add to this important topic, I feel that I am more than justified in writing this article.

In the first place, I have 600 consecutive operations to report and from them we can certainly draw deductions.

In the second place, sacral anæsthesia has been developed recently, as applied to this and allied operations. I regard sacral anæsthesia as one of the greatest additions to surgery. In our 600 cases, there was but one death and that due to pneumonia from ether. Had we used sacral anæsthesia, we probably would have had a 100 per cent recovery.

In the third place, certain modifications and innovations which I think are detrimental have crept in and I hope this paper may succeed in emphasizing certain important facts, and in dispelling certain illusions.

Finally, I feel that the clamp and cautery method of operating is the best. It is the safest, and that should be our first reason for adopting any method of operating for any condition. It is safer than the injection; it is safer than the ligature, in fact, it is safer than any other method of operating for hæmorrhoids.

It may be classed as radical. No other method comes as near being a radical procedure except the Whitehead operation, and for obvious reasons the Whitehead operation is one which should never be performed.

It is the most comfortable and least painful method. There is an easy convalescence, resulting in speedy recovery. It is so far ahead of the incomplete operations, such as injections, electric punctures, single ligation, etc., that it should be given preference whenever a patient can afford to spend 2 or 3 days in bed. There was the objection that a general anæsthetic had to be given. Sacral anæsthesia has done away with this.

We were able to tabulate 600 consecutive cases operated upon in my service at Lebanon Hospital. Of these, 599 recovered and 1 died, making a total of 600 cases.

The sex was noted in 573 cases, and it showed the interesting fact that there were 475 males as against 98 females; there being nearly 5 males to 1 female.

The age was noted in but 240 cases. Of these there were but 4 patients under 20 years of age, and but 13 patients over 60 years of age, so that the majority (223) of these patients ranged between 20 and 60 years of age.

Sacral anæsthesia was attempted in 64 cases and was successful in 61 of these. In other words, we succeeded in over 95 per cent of our attempts.

There was but 1 death and this was due to pneumonia following the administration of ether.

There were no serious complications, and none of these patients remained long in the hospital. Usually they were discharged within 4 or 5 days, but occasionally they remained as long as a week.

Retention of urine occurs occasionally, but not often.

We feel that the results obtained in this series of cases justify us in the high regard we have for the method employed.

Sacral anæsthesia is by this time a well established procedure. Its details have been sufficiently worked out so that it has long since passed the experimental stage. We know now pretty accurately what we can do with it and how it should be done. By its employment, the region of the perineum and lower rectum can be thoroughly anæsthetized with a minimum of risk. It must be borne in mind that sacral anæsthesia is not spinal anæsthesia. Spinal anæsthesia is dangerous, sacral is not. Local anæsthesia by the infiltration method in a region which can not be surgically sterilized, is decidedly dangerous. As far as we know, sacral anæsthesia, if properly administered, is practically free from risk. Sacral anæsthesia enables us to employ a radical procedure such as the clamp and cautery operation, or perineal prostatectomy, upon patients who would otherwise have to be considered inoperable. In other words, it takes certain patients who are bad surgical risks out of the inoperable class and offers them a chance of cure.

I did not begin to employ sacral anæsthesia until the fall of 1918, so that in this series of 600 cases, we attempted to use it in but 64. In this series of 64 cases we were unsuccessful in 3. We

Fig. 1. Posterior surface of sacrum showing needle in hiatus sacralis.

Fig. 2. Lateral view of sacrum showing needle entering canal.

were successful in over 95 per cent. Abnormality of the sacrum, excessive fat over the bone, etc., occasionally may make it difficult or impossible to introduce the needle properly.

When successful, sacral anæsthesia is ideal for these operations. The patient is conscious, he is absolutely free from pain, the sphincter can be dilated fully, the rectum satisfactorily explored, and the hæmorrhoids operated upon with deliberation and precision. After the operation, the patient is not only free from the disturbing effects of a general anæsthetic but his first postoperative hours are rendered comfortable because the analgesia passes off slowly.

METHOD

The operator must be familiar with the anatomy of the sacrum to employ this method successfully.

Thirty cubic centimeters (about 1 ounce) of a proper solution of novocain is injected into the sacral canal. The entrance to the sacral canal is to be found at the hiatus sacralis. The hiatus sacralis is indicated by two cornua or tubercles of bone. They mark the lower end of the sacral canal. They exist because of the absence of the fifth spinous process of the sacrum. They can be felt just above the junction of the coccyx with the sacrum. The needle must be introduced between these cornua, in the axis of the sacral canal. It passes through the drum-like, fibrous membrane which covers the lower end of the canal. After this membrane has been passed, the needle must not be introduced more than 2 centimeters. If the end of the needle is properly in the canal there will be but little resistance to the flow of the fluid. It will be as though the injection were being made into a cavity. After infiltrating the skin and superficial fascia, with novocain solution, the *needle detached* from the syringe should be introduced into the canal and watched to be sure there is no flow of blood or cerebrospinal fluid through it. Should blood flow, the needle is in a vein, and must be readjusted before the injection. Cerebrospinal fluid will not flow unless the needle used is too long. Withdrawing the needle slightly overcomes the difficulty. This is something I have never encountered. When the needle is properly in the canal, the syringe is attached and 30 cubic centimeters of the fluid are injected. Lack of pressure resistance proves that the injection is being made into the canal.

I employ a solution of novocain about 1¼ per cent, although 1 per cent is often strong enough. Some operators employ as high as 2 per cent. Adrenalin is not necessary, but I have used it in the majority of cases, having employed novocain tablets or ampoules which contained it. The anæsthesia begins in about 8 to 10 minutes; it should be complete in 20. It will last 1 or 2 hours, and the operation may be begun as soon as the anal margin is free from sensation.

As the operative procedure is based on certain anatomical and surgical lines, it is well for us to consider what may be called the anatomy of hæmorrhoids.

The veins of the rectum empty both into the general and into the portal circulation. For our purpose, it is not necessary to go into the question very deeply. Just above the anorectal line, there are numerous small venous sacs called pools. These are elliptical in shape and about the size of a grain of wheat. These little pools surround the rectum and from them small veins proceed in all directions to form an intricate network, completely encircling the rectum. This is the internal hæmorrhoidal plexus. The veins from this plexus

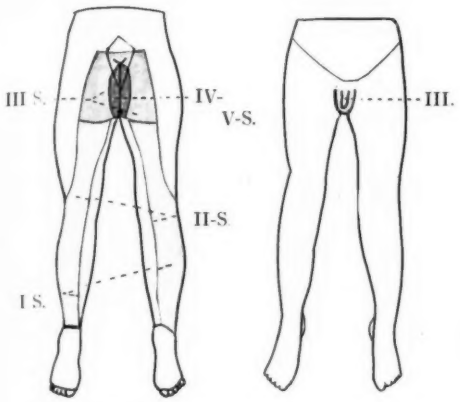

Fig. 3. Diagram showing sacral nerve distribution.

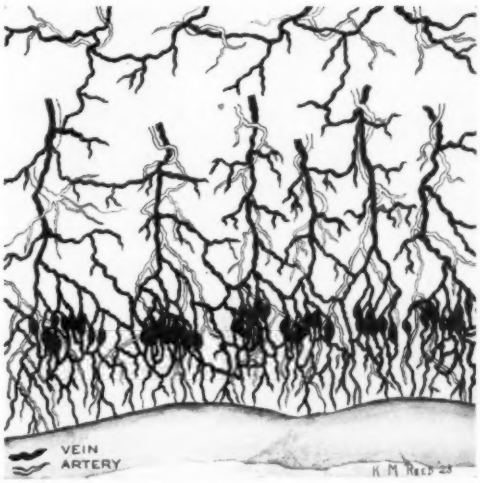

Fig. 4. Rectal supply showing hæmorrhoidal pools, partly schematic. (Redrawn from Tuttle.)

empty into the portal system. They are without valves and because of man's upright posture and the great length of the veins they have to sustain a good deal of hydrostatic pressure. As they are being but poorly supported by surrounding tissue, it is no wonder they readily become dilated and form hæmorrhoids. Above the level of the internal sphincter, these veins unite to form trunks which penetrate the muscular walls of the gut. These venous trunks unite above to form the inferior mesenteric vein, thus emptying into the portal circulation.

The important fact is that hæmorrhoids are really varices or dilatations of some of the branches of the internal hæmorrhoidal plexus.

As time goes on, there is an increase of fibrous tissue surrounding the varices so that a hæmorrhoid consists of more than a dilated vein or venous sac; it consists of a varix surrounded by a more or less dense, fibrous tissue. It is necessary to bear this anatomical arrangement in mind when we come to apply our surgery.

THE OPERATION

Breaking the continuity of the internal hæmorrhoidal plexus into three sections, it becomes practically a radical procedure. As the wounds made by the clamp and cautery are in the long axis of the canal, they do not tend to cause stricture as might result if the clamping were improperly done, across and not with the long axis. If contraction takes place, it will shorten the rectum, not narrow it. As far as infection is concerned, it is safe, because the crushing and cauterizing of the hæmorrhoidal stump or base close the lymphatics and capillaries. The burning with the cautery thoroughly sterilizes the stump as no other method can. By the time the eschar comes away, the lymphatics and capillaries will have been blocked so that secondary infection is prevented. If crushing and burning the skin at the anal margin are avoided, the patient will be free from postoperative pain.

Usually, the operator grasps three hæmorrhoidal masses, one on each side of the posterior commissure and one near the anterior commissure. This breaks the plexus into three sections, as stated above. Intervening masses, if any, will shrink and seldom is it necessary to operate upon anything more than these three.

The instruments essential are several pairs of hæmorrhoidal forceps, a hæmorrhoidal clamp, a pair of scissors curved on the flat, a cautery, and of course a rectal speculum.

Hæmorrhoidal forceps, such as Tuttle's or Pennington's, have their blades at an angle with their handles. The blades are corrugated or toothed and about ¾ inch in length.

I prefer Kelsey's modification of the Smith clamp. It has two strong flat blades, tongued and grooved, about 2¾ inches in length. Kelsey's model is perfectly satisfactory and I would advise against any modification of it, especially against ivory plates on the under surface of the blades. These interfere with the proper clamping and crushing of the hæmorrhoids, and with the proper sterilization of the stump.

There is nothing better than a Paquelin cautery in working condition, but it is difficult to keep in

order. Perhaps the best cautery is an electrical one, if the blade is sufficiently large. A practical cautery is a set of small soldering irons which can be heated over a gas stove.

Operative procedure. After the patient has been anæsthetized, with sacral anæsthesia, he is placed in the lithotomy position, with the foot of the table a little higher than the head and with the patient's hips slightly overhanging the end of the table. The operation consists of the following steps:

1. Resection of prominent skin tabs flush with the anal margin.

2. Dilatation of the sphincter muscle. Dilatation of the sphincter muscle is a most important part of this operation, and of nearly all operations on the lower rectum. The object is to stretch the sphincter so as partially to paralyze it for a few days. This will prevent spasm and postoperative pain. It should be done gently and slowly by introducing two fingers and finally both thumbs into the anus and slowly, but firmly, stretching the sphincter anteroposteriorly until the muscle yields. There should be no tearing but thorough stretching of the muscle. I believe that this is accomplished better with the hands than with one of the instruments devised for this purpose.

3. Exploration of the rectum. Explorations of the rectum should be thorough, and, of course, can be accomplished much better with the parts anæsthetized and with the sphincter thoroughly dilated. The final diagnosis should be made at the time of the operation.

4. Grasping of the three hæmorrhoidal masses in hæmorrhoidal forceps. The operator should isolate, distinctly, three prominent hæmorrhoidal masses; one on each side posteriorly, and usually one near the anterior commissure. They should each be grasped with good hæmorrhoidal forceps so that the hæmorrhoidal clamp may be surely applied satisfactorily to each mass.

5. Application of the hæmorrhoidal clamp to one of the masses, crushing the same after having cut with the scissors a groove through the skin margin. A groove should be cut with the scissors at the anal margin in which the hæmorrhoidal clamp will lodge. The skin margin should not be crushed nor burned. The hæmorrhoidal clamp must be placed in the long axis of the bowel, preferably, with the heel at the highest portion of the tumor. The clamp should be closed and screwed down, crushing the hæmorrhoidal mass as completely as possible.

6. Cutting off the redundant hæmorrhoidal tissue with flat scissors. The redundant tissue should be trimmed off with flat scissors, leaving about ¼ inch of the tissue above the clamp.

7. Cauterization of the stump above the clamp. The cauterizing of the stump must be done slowly and carefully. If a Paquelin cautery is used, a dull cherry red is preferable to a bright white heat. The object is not to cut away this tissue with the cautery, but to char it thoroughly so that it will remain as a firm eschar.

8. Treatment of the remaining hæmorrhoidal masses with the clamp and cautery. After treating the prominent masses a fourth mass may be punctured with the cautery or clamped and cauterized, but this is not usually necessary and should rarely be done. The continuity of the hæmorrhoidal plexus having been destroyed, remaining varices are pretty sure to disappear.

9. Application of a proper conical pad and T-binder. I regard the immediate dressing almost as essential as certain steps of the operation. I apply directly over the anus a pad made of twelve thicknesses of gauze folded into a wide cone shape, firmly held by a T-binder. This pad must not enter the anus. Its purpose is to act like a truss and support the anus so that the hæmorrhoidal area will stay well within the external sphincter. There will be little or no swelling and œdema; and there can be no strangulation of the tissues. If the skin has not been crushed or burned the patient will be practically free from pain.

The practice of inserting into the rectum a so-called "dressed tube," that is to say a rubber tube surrounded with gauze and tied into a spool shape, is a pernicious one. I call this an artificial corncob. Binnie says it should be reserved for personal enemies and public malefactors. It can only add to the danger of hæmorrhage by prematurely disturbing the eschar, and to the danger of infection by rubbing material into a raw surface. If this paper can aid in doing away with this practice, I shall feel that it was worth the writing.

The after-treatment is very simple. The bowels should never be "tied up." Morphine and opium are not used; they are not necessary. We give the patient mineral oil, beginning with the night of the operation and three times during the next day. We expect the bowels to move on the second day after the operation. If the oil does not accomplish this, we give a mild dose of sodium phosphate or other saline laxative. The tight compress should be worn for 24 to 48 hours; thereafter, the patient will merely need a pad for cleanliness. These patients are notably comfortable and are able to be up and about within 2 to 4 days, and to resume their occupations within less time than a week.

SIMPLE EXCISION IN CERTAIN CASES OF DUODENAL ULCER[1]

By LeGRAND GUERRY, M.D., F.A.C.S., Columbia, South Carolina

I BELIEVE that, when operating for duodenal ulcer, excision of the ulcer should form a vital part of the operation whenever possible. It matters not what the method of attack is: pyloroplasty, gastroduodenostomy, or what not. I do not say that excision should always be done, for the word always has little, if any place in surgery. Oftentimes, it is not possible to practice excision. My contention is that the principle is basically sound and should be applied whenever conditions permit.

What we should be seeking primarily in this, as well as in other fields of surgery, is the understanding and establishment of certain great principles that must underlie all of our work if it is to endure. No method that does violence to basic principles contains in it the elements of permanent success.

Such wonderful strides have been made in recent years on the mechanical side of surgery, method and technique have been so developed and amplified, that we at times lose our way and confuse principle with method and method with principle. For example: probably the limit has been reached so far as method is concerned in radical operation for carcinoma of the breast. I seriously doubt if any more extensive operative procedure *per se* will materially reduce the incidence of recurrence in breast carcinoma, but getting the cases earlier will.

The mortality in acute intestinal obstruction is nearly as great today as it was 50 years ago, with all of the brilliant improvements in technical work. Here, again, method has practically reached its limit and is unable to do more for us.

What I am trying to say is that much of our trouble, certainly most of my trouble in failure to cure duodenal ulcer, is not due to any lack of operative schemes or their technical performance, but failure to select the methods which will most fully meet the need in each individual case. Thinking more in terms of method than in terms of principle, the way is lost.

Conclusions are very dangerous things to draw, yet we are willing to risk this one: No one operation is suitable in all cases of duodenal ulcer and no one operation will cure all cases.

To use one method exclusively is to invite failure. We must have many strings to our bow. And the heart of the surgical problem is to understand the principle involved so clearly that the method selected will most surely convert such principle into practice.

Quoting from a former paper of mine read before the Southern Surgical Association, 1921, on the choice of operation for duodenal ulcer: "John

Fig. 1. A drawing showing the type of stomach and duodenum with an ulcer in the location suitable for simple excision.

Fig. 2. Elliptical incision for excising ulcer. When ulcer is excised ample opportunity is afforded for inspection of the inside of the duodenum.

[1]Read before the Southern Surgical Association, December, 1923.

Hilton, in his truly great book on rest and pain, lays bare the principle that must govern successful treatment of all ulcers. Hilton says, in speaking of the process of repair in wounds in primitive man: 'Pain was made the prime agent. Under injury, pain suggested the necessity of, and indeed, compelled him to seek for rest. Every deviation from this necessary state of rest brought with it, through pain, the admonition that he was straying from the condition essential to his restoration. He must have observed with astonishment the breaking asunder of the newly formed tissue or the steady development into normal structure, which occurred in exact accordance with the disturbance or rest to the parts, which the sense of pain had enabled him to regulate so accurately, and to employ so beneficially for his own personal relief and comfort . . . What I have here endeavored to inculcate is that growth and repair bear an exact relation to due physiological rest, local and general.'"

This principle applies fundamentally to the cure of all ulcers. The method which comprehends this fact will endure; the one which does not, cannot endure. For, in a very real sense, there is no difference between ulcer of the leg, ulcer of the rectum, or ulcer of the duodenum. The same principle underlies the process of growth and repair in both animal and vegetable kingdom. Just as sleep is man's greatest earthly solace, bringing physiological rest to his tired body and brain, so mechanical and physiological rest to the local ulcer area is the one great essential of repair. Let us remember also, that just as the body chemistry is changed during the process of physiological rest to normal alkalinity, so the chemistry of the ulcer area will be likewise changed by mechanical and physiological rest locally applied: this in turn means a healed ulcer.

With what has been said as a yard stick, let us see if we can fairly measure the value of simply excising the ulcer in that small group of cases in which the method is applicable. The illustrations will make this point clearer.

As seen in Figure 1, it is certainly not good practice to divide the pyloric sphincter unless there is some real reason for so doing. In a large, freely mobile duodenum, with a perfectly discrete ulcer on the anterior surface of the cap, situated ¾ inch or more from the pyloric sphincter, and not in any way within the bite of the sphincter, such an ulcer can be cured by simple excision. The great need for dividing the pyloric sphincter is to help supply mechanical and physiological rest to the operative area. When the ulcer is completely off of the sphincter, beyond its grasp, we gain nothing by dividing the sphincter. As a matter of fact, final decision for simple excision is not made until after the ulcer has been excised and the whole ulcer-bearing area of the duodenum subjected to most careful direct inspection.

Frequently two ulcers are present. When this is the case it is still possible to manage satisfac-

Fig. 3. First row of stitches.

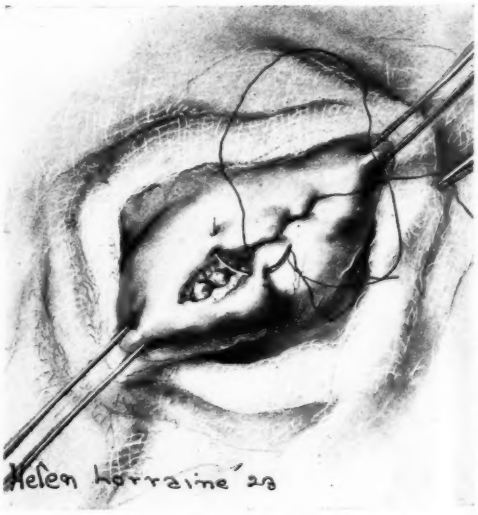

Fig. 4. Second row of stitches with operation completed.

torily the second ulcer through the opening made by the excision, or if it seems best, after the duodenum has been inspected, it is perfectly feasible to convert the excision operation into a pyloroplasty, preferably of the Finney type. This matter of inspection of the duodenum is an important point in the operative procedure because of the valuable information gained.

Figure 2 shows that when the ulcer has been completely removed, practically all is accomplished that can be accomplished, and certainly the principle of applying mechanical and physiological rest to the inflamed area, as the basis of cure for ulcer, obtains when this has been done.

Figure 3. There is no interference with the segmental activity of the stomach, hence neither the mechanics nor the physiology of the stomach has been disturbed.

We are quite certain that when the case has been properly selected, this simple method will secure a very high percentage of complete symptomatic cures and as Dr. Judd so well pointed out, in a paper by Dr. Rankin and himself, published in the August number of SURGERY, GYNECOLOGY AND OBSTETRICS, 1923, that the operation will be done with increasing confidence. We are particularly glad to quote the following from Dr. Judd's paper, already referred to, because it bears directly on the point that we have been insisting upon: "In the light of the present knowledge of the cause of gastric and duodenal ulcers, it is logical to remove the offending lesion together with the foci of infection, rather than to trust to a side-tracking procedure which leaves a pathological entity in which healing is a moot question and in which exacerbation gives rise to a chain of symptoms similar to those for which the patient first sought relief." The author in this same paper also points out that in the series of cases treated by the method of excision there has never been an occasion to supplement the operation by gastro-enterostomy because of pyloric stenosis.

We have no unusually large number of ulcer cases from which to draw conclusions, yet surely the experience is extensive enough, with careful study, to be most suggestive. Cases treated in this way convalesce most smoothly and comparatively speaking, are freed from many of the distressing postoperative sequelæ. If the principle is right then our contention must be a close neighbor to the truth.

DIRECT LEVERAGE IN THE REDUCTION OF CERTAIN FRACTURES

By JAMES E. M. THOMSON, A.B., M.D., F.A.C.S., Lincoln, Nebraska

LEVERAGE and the use of levers in the reduction of fractures are old and well tried agents. The technique of applying direct leverage to broken bones varies in the hands of different operators; therefore in the following technique one merely adds the element of fixation to the method described by Hugh Owen Thomas, the famous Liverpool Surgeon, in his *Contributions to Surgery and Medicine* published about 50 years ago. A quotation from this volume relative to the procedure herein followed is interesting: "My failures continued (speaking of old backward dislocations of the first phalanx of the thumb) for a long time before I bethought myself of applying to these dislocations a mode of operation, which I was constantly applying to compound injuries of joints and fractures, if not immediately reducible. It is far better to apply a trustworthy plan, though it involves the compounding of the dislocation which is better than irretrievably injuring the part by delay and frantic efforts at reduction, which is probably impossible. The operation which must succeed is extremely simple." Dr. Thomas, through a small stab wound incision near the base of the thumb on the palmar surface, would insert an S-shaped lever and with its end behind the head of the first phalanx he would lift it up and with traction on the thumb lever it into the joint socket (Fig. 2).

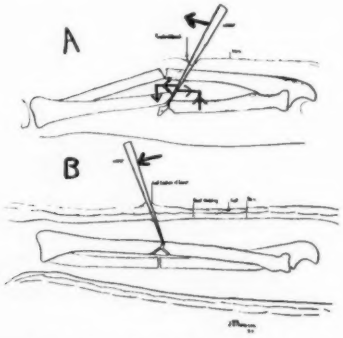

Fig. 1. *A*, Fracture of middle third of radius and ulna. Lateral view, showing lever inserted through puncture wound in place between ends of overriding fragments of the radius. Leverage is exerted in direction of arrows. *B*, Shows position of lever after reduction of fragments. Plaster-of-Paris cast applied causing fixation of the lever, thereby retaining apposition of the fragments.

Some 4 years ago, when associated with Dr. J. Stanley Welsh of this city, we had a Colles' fracture which was extremely difficult to reduce. At Dr. Welsh's instigation a small instrument was forced through the skin over the lower end of the radius. Under the fluoroscope it was pushed between the fractured ends and the fragments levered into position. It was found, however, that when the apposition was accomplished the lever was essential to maintaining proper position, for when the leverage was released the position was lost. At my suggestion, in this case, we embedded the lever in the cast and maintained excellent apposition in this manner. Dr. Welsh's report of this procedure and its future possibilities, if used for the reduction of fractures of other bones, appeared in the *Journal of the American Medical Association*.[1] The result was so pleasing that often since that time in my experience, when manual manipulation failed to bring absolute reduction, this form of direct leverage was attempted, with uniformally successful results.

To the present we have used this method successfully in reducing fractures of the clavicle, humerus, radius and ulna (one or both bones), femur, in fractures about the ankle and meta-

[1] J. Am. M. Ass., 1920, lxxiv, 801.

Fig. 2. Drawings illustrating S-shaped lever and Thomas' method of its application in the reduction of dislocations of the first phalanx of the thumb. (After Hugh Owen Thomas.)

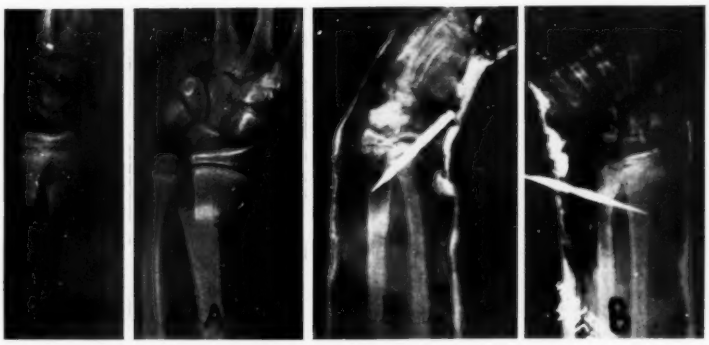

Fig. 3. *A*, Fracture of the lower third of the radius. *B*, Fracture reduced with lever embedded in the cast for fixation of fragments.

tarsals. It is our opinion that this procedure should not be followed except after a reasonable effort at manual manipulation has failed. The technique of this procedure can be more simply carried out under the fluoroscope; however, it is just as applicable if an incision is used large enough to admit the forefinger into the wound, so that with the aid of the finger as a guide to the lever the apposition of the fragments can be assured. When this work is done under the fluoroscope there is a minimum amount of trauma and also the least possibility of infection, but in fractures of the femur and leg bones, where fixed traction must be maintained on a fracture table the fluoroscope is not practical.

In a fracture of the forearm in the middle third, for example, the type of lever we use is an ordinary dental probe with a rounded end. Where heavier levers are needed we use one-fourth inch round steel 8 to 12 inches long, with a blunted point. After the field has been thoroughly cleansed and operator and instruments prepared, the anæsthetized patient is placed on the X-ray table with the extremity under the fluoroscope. Before dimming the light (Fig. 1, *A*), a small stab wound is made with a scalpel over the fractured fragments at the most convenient position for the application of the leverage. The point of the lever is inserted in this small wound. When I first did this work, I simply pushed the intrument through the skin, but the pressure necrosis around the lever was sometimes rather disagreeable, but the small incision has relieved all pressure on the skin. With the lever inserted into the wound, an assistant, by grasping the hand of the patient, makes traction on the extremity. Lights are dimmed and, guided by the use of the fluoroscopic screen, we pass the lever between the ends of the fragments in the same plan with the overriding and displacement, the end of the lever being inserted to the medullary portion of the under fragment. Then the lever is brought through an arc toward the upper fragment, making pressure forward and downward against the upper, and backward and upward against the under fragment. The operator's free hand aids in perfecting the alignment

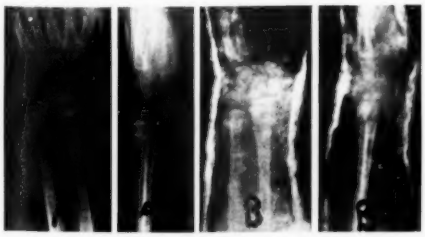

Fig. 4. *A*, Fractures of lower third of radius and ulna. *B*, Reduced by the use of two levers. The levers were removed after the cast became hard without loss of apposition of the fragments.

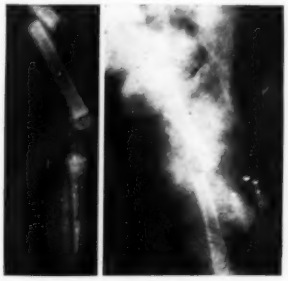

Fig. 5. *A*, Fracture of middle third of femur, 1½ inches shortening—3 weeks old. *B*, After manipulation and traction, and the application of double spica. Full length without apposition or alignment.

Fig. 6. Same patient as shown in Figure 5. Reduction accomplished by means of direct leverage. Lever embedded in cast for fixation of fragments.

and apposition. Sterile dressings are placed about the lever and saturated with alcohol. Sterile sheet wadding bandages are applied to the extremity and the plaster-of-Paris cast over this, anchoring the lever in the position which maintains apposition of the fractured fragments (Fig. 1, *B*). The cast should extend from the upper third of the arm to the base of the fingers, the forearm flexed to an angle of 90 degrees with the arm and in supination, the hand in dorsiflexion. When the cast is hard the end of the lever can be sawed off so that the patient will not bump the lever and cause displacement of the fragments. After a week or 10 days a small opening in the cast around the lever is cut and the lever pulled out. By this time callus has begun to form and approximation is relatively assured. When both bones are overriding, two levers may be used and both of them be embedded in the cast.

When it is impossible to use the fluoroscope in applying this technique, as in fractures of the leg and thigh where fixed traction must be maintained on the fracture table, it is best first to obtain full length of the limb by means of traction and then make a small incision just large enough to permit the insertion of the lever and the index finger to the fracture fragments. With the finger as a guide the lever is forced between the ends of the fragments and leverage applied as previously described; a few stitches are needed to close the wound, the lever is embedded in the plaster cast as before.

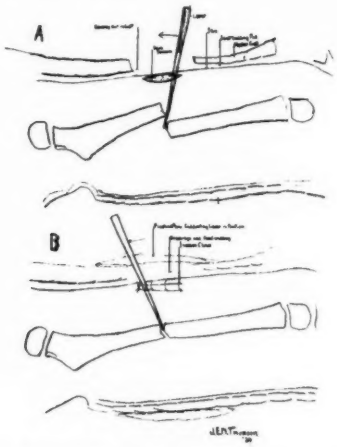

Fig. 7. Same patient as shown in Figures 5 and 6. Illustrating the technique of applying leverage. *A*, Shows window in cast, small incision, lever inserted between fragments. *B*, After reduction. Wound closed. Plaster reenforcement over window for fixation of lever.

I wish to report four cases illustrating certain phases of this technique.

The first case, a young man who fell and broke the radius about 3 inches from the lower end (Fig. 3, *A*). Manipulation did not reduce this fracture. The lever was inserted after the manner first described and the apposition accomplished (Fig. 3, *B*).

In 8 days the lever was removed and also the cast was changed as it had been necessary in the first cast to place the hand in the so-called "pistol-grip" position in order to aid in the approximation. On the second cast the hand was put in dorsiflexion and the forearm in supination. Three weeks later the cast was removed and physiotherapy instituted. A cock-up splint was worn for 10 days. At the end of 6 weeks he had no disability.

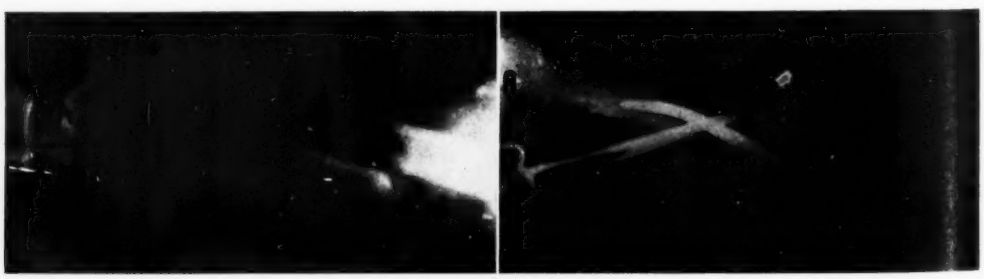

Fig. 8. *A*, Old fracture of middle third of femur. *B*, Reduction accomplished by crossed, double leverage directly applied to both fragments, and embedded in plaster cast for fixation of fragments.

Another case, a fracture of the forearm, in which both bones were fractured in the lower third (Fig. 4, *A*). Reduction was accomplished by the use of a lever on both bones. The arm seemed so firm that as soon as the cast was set the levers were removed and the fragments remained intact. (Fig. 4, *B*). A perfect result followed.

We have seldom found it necessary to use this method in fresh fractures of the femur but have had occasion to apply it mostly in old unsuccessfully treated fractures having shortening and deformity. These may by manipulation, or by osteotomy be rebroken at site of previous fracture and then by fixed traction and direct leverage be brought into proper position. The case of a 5 year old child will illustrate my procedure.

He had a fracture of the middle third of the femur 3 weeks before he came to us. His treatment had consisted of three manipulations in an effort to reduce the fracture, followed by Buck's extension. He had, on examination, 1½ inches of shortening which is a great deal for a child of 5 years (Fig. 5, *A*). Manipulation and fixed traction brought full length to the limb and a double spica was applied. X-ray, however, showed that although the fragments were full length they were not in apposition and alignment (Fig. 5, *B*). He was placed on the fracture table again, a window was made in the cast over the fracture (Fig. 7, *A*). A small incision was made and the lever was guided to the fragments and perfect apposition was accomplished. The lever was fixed in the plaster reinforcement over the window cut in the cast (Fig. 7, *B*). The child had an uneventful recovery and a splendid result followed.

Another instance where a slightly different technique was used was the case of a man who, a few weeks before, had fractured his thigh in the middle third with slightly over a 1-inch shortening but a marked deformity (Fig. 8, *A*).

He was placed on a fracture table, and through a small incision osteotomy was performed. During this procedure a portion at the outer side of the shaft was broken off. In this instance we used a long forceps inserted into the medullary canal of the lower fragment as a lever. On account of the callus and position of the upper fragment, it was necessary to use another forceps inserted into this fragment. The use of the double lever was suggested by my associate, Dr. H. W. Orr. With a lever in both fragments excellent position was accomplished (Fig. 8, *B*). The forceps were embedded into the cast for fixation purposes and removed in 10 days with no complications, and a most satisfactory end-result followed.

Personal deductions:

1. So far in the use of this method in the reduction of fractures we have had no complications and our results have been uniformally pleasing.

2. Many fractures which are apparently irreducible can by this simple method of direct leverage be perfectly reduced with a minimum danger of infection and damage to the soft tissues.

3. The embedding of the lever in the plaster-of-Paris cast, after reduction has been accomplished, insures adequate fixation of the fractured fragments.

SOME QUESTIONS RELATING TO SURGICAL DRAINAGE OF THE PERITONEUM[1]

By ROBERT LEE PAYNE, M.D., F.A.C.S., Norfolk, Virginia
Surgeon St. Vincent's Hospital

IN the surgery of intra-abdominal lesions complicated by contamination or infection the operator is most frequently uncertain whether to provide for an extra-abdominal outlet through some form of drainage, or to close the wound tightly. The recent literature has been full of advice, dictatorial almost, calling for the adoption of the dictum, "when in doubt do not drain." Unfortunately for many patients this dictum, set forth by experienced men, has resulted in serious complication or death when carried out by inexperienced operators, and it seems to the writer that the enthusiasm of some skilled operators who close the peritoneum without drainage is calculated to stimulate a premature surgical judgment into sins of omission that will, in most instances, militate against the welfare of the patient.

This then is the cause I wish to plead before you and the whole question must hinge on the first premise, namely, that the peritoneum, as a tissue lining the intra-abdominal cavity cannot be drained, or does not drain, in the general acceptance of the term.

Yates' experiments, in some of which I had the opportunity to assist, proved conclusively that gauze, rubber, and glass tubes when introduced into the normal peritoneal cavity were completely enmeshed or covered with a dense layer of fibrin within a period of 4 hours and entirely impervious to fluids. What is true of normal peritoneum is true to a lesser degree of injured peritoneum and the failure to recognize this difference lies at the bottom of the practice of many surgeons who close contaminated and infected areas of the peritoneum without drainage. We must recognize that infected peritoneal tissue has much less resistance to injury than normal, or that normal peritoneum can annihilate many more bacteria without peritonitis. We must also recognize that an injured area of peritoneum can be drained but this so-called drainage must be made in the nature of an outlet, or pathway of least resistance from a strictly local area, and not the general cavity, along which the bacteria, toxins, and other products of infection can follow.

In a local area of contamination or infection it is certain that a drain to this point becomes walled off from the remaining cavity by plastic lymph and fibrin in a period of time varying from a few hours to 24 hours, this representing the mechanical defensive mechanism of the tissue. There is also a biological defensive mechanism active at the same time, consisting first of a wonderful absorptive power and secondly, the ability of the peritoneum, under altered physiological conditions, to supply large amounts of transudate or exudate. This latter process is spoken of by some writers, Horsley in particular, as a reversal of the lymphatic circulation, but the writer is inclined to the interpretation that the condition is analogous to the biological principles of an inflammation, namely, a slowing of the currents in the local blood and lymph channels, a dilatation of the vessel walls and an out-pouring of their fluid content rich in phagocytic cells.

Since peritoneal infection spreads by continuity in the beginning, it is rational to assume that proper drains to these inflamed or injured areas not only assist for a while in the biological defensive mechanism but also provide a pathway of least resistance for the products of bacterial growth. What then is a safe practice to be followed with regard to drainage of the peritoneum when injured by contamination or infection? This, I believe can be answered only by a wide experience, a well developed and keen evaluation of the local living pathology and not by a universal dictum of "when in doubt do not drain."

The old maxim, that more understanding can be acquired through the sense of vision than through all the other senses combined must surely be applied to the interpretation of living pathology in the peritoneal cavity. The problem of drainage is an individual one, is predicated on the operator's conception of the infective status of the case, cannot be instituted or omitted by any rule of thumb, and is always dependent on the varied states of the peritoneum seen in the progress of an infection having varying degrees of virulence, in patients of varied resistance and observed at different periods of time from the onset of attack. How then are we going to evaluate the teachings of these surgeons who broadly advocate the omission of drainage in the infected and contaminated peritoneum? For instance, one rather widely quoted author says: "Except in definitely localized and walled off abcesses drainage of the

[1]Read before Southern Surgical Association, White Sulpher Springs, West Virginia, December 12, 1923.

peritoneal cavity is contra-indicated." May we not justly ask, what of the majority of peritoneal infections which are definitely local in their inception? Most assuredly all local infections of the peritoneum do not result in local abscesses. What will we do with those virulent types of early peritonitis, always local in the beginning, that soon progress by continuity to a wider area of encroachment? Would not a proper drain to the source of such an infection provide a pathway of least resistance and also augment the inherent defensive mechanism of the peritoneum, both mechanical and biological?

Another editor of one of our journals states: "We have learned that we cannot successfully drain for any inadvertent contamination of clean peritoneal surface that may take place in an operation, whether the contamination be from open gut or from contact with actual pus." If this were true, then we need no longer fear the susceptibility of the mesentery in small gut resections, nor the widely recognized danger of peritonitis in colon resections. In contamination we do not know the character of the organisms or the tissue changes produced by them. Hence, in soiling normal peritoneum, a provisional or precautionary drain should always be used. When in doubt always drain for 24 hours.

Many surgeons are omitting drainage in cases of gangrenous appendicitis with associated but distinctly local peritonitis. The fallacy of this practice becomes all the more apparent when we are reminded of the fact that the veins from the appendix drain directly to the portal and recall the number of cases of fatal pylephlebitis reported in the literature following the removal of a gangrenous appendix. The peritoneum will not drain, but in these cases the local area can be afforded a pathway of least resistance.

Wilensky and Berg[1] attempt the practical criterion of taking direct smears from the infected peritoneal surface, counting the greatest number of organisms per field, and claiming that one organism in four or five is compatible with closure without drainage. Their deductions are based on the study of 21 cases. As against this optimism, Rulison[2] reports on the bacteriological study of 189 cases of peritonitis and concludes that the type of organisms recovered at operation does not seem to furnish any information of prognostic value and that various symbioses were found alike in both mild and severe grades of peritonitis.

The many characteristic tissue changes in the peritoneum produced by various bacteria are never the immediate cause of death, but this cannot be said of the toxins elaborated by the infection. Thus we speak of the virulence of certain bacteria but we have no means of measuring an individual's susceptibility. MacCallum says the outcome of peritoneal infection is "dependent on the balance between power of resistance and the virulence of the bacteria." Given a patient already showing the effects of bacterial invasion, can we estimate just how much more additional toxin the victim can resist without further harmful results? It is in just this position, "when in doubt," that some experienced surgeons are advocating closure without drainage and while it is well to record the results in these cases, yet it seems to be a dangerous teaching for universal acceptance. In the majority of these infections a proper drain to the definitely local source of infection will usually, in the first 24 hours, provide a pathway of least resistance for a certain amount of toxin that could possibly prove lethal if retained. One fatality in no matter how large a series of cases is sufficient to condemn the adoption of the principle, "when in doubt do not drain." The mission of the operator is definite, and we have no license to capitalize our operating room doubts and then gamble with them against a human life.

A word regarding drainage in diffuse peritonitis: We must always be mindful that the experiments of Yates, substantiated a hundred-fold by others, have proved that the general peritoneal cavity cannot be drained; that adhesions by fibrin completely isolate a drained point from the remaining cavity in a limited number of hours and that the source of the infection is the only problem with which the surgeon can in any way deal. Therefore the practice of draining low points of the abdomen for injured areas higher up is unsound and all necropsies following death from general peritonitis witnessed by the writer have always shown the drained area isolated by adhesions with always an equal surrounding peritoneal reaction of diffuse inflammation. Proper drainage then, of the primary source of infection is all that is necessary. The remaining peritoneal tissue had best be left to its natural defensive forces.

The treatment of peritonitis then resolves into, first, removal of the source of the infection and second, the prevention of the spread of infection. In carrying out the second phase of treatment we have at present nothing to rely upon but the institution of proper drainage. This procedure operates by making for the source or infected area a safe pathway or outlet in the direction of least resistance. Adhesions isolating the infected area,

[1] Ann. Surg. May, 1923.
[2] Ann. Surg. December, 1919.

plus resistance local and general, are the patient's salvation. We know that drains augment the formation of adhesions by stimulating the mechanical defensive mechanism; thus we may properly conclude that the prevention of the spread of infection in peritonitis is augmented by making the area extraperitoneal and this result is partly attained through the use of proper drainage. It is universal surgical knowledge that the peritoneum must have time to mass her protective forces. In acute infections with and without soiling, we have as yet no definite standards concerning the exciting organisms or the pathology present; the protective forces have not had time to indicate how well the tissues will be cared for in the fight; therefore, closure without a precautionary outlet or lead by proper drain is taking a chance that should not be condoned.

The principles outlined herein have been strictly adhered to by me during the past 18 years and the results may be summarized through the analysis of a consecutive series of cases operated upon during the 10 year period ending November 1, 1923. The most common cause of peritonitis is infection beginning in the appendix.

In St. Vincent's Hospital during the period mentioned, the writer has operated upon 1,203 patients, following a diagnosis of appendiceal infection in one form or another. In 940 of these cases the pathology was interpreted as being confined strictly to the appendix and its mesentery and all were closed without drainage. In 263 patients, there was recorded a postoperative diagnosis of peritonitis, local or diffuse, in one form or another, and all of this type were drained. The muscle-splitting or gridiron incision was used in all but 27 cases and special stress was laid upon confining the operative manipulations strictly to the original focus of infection. The type of drain commonly known as the cigarette, consisting of gauze rolled in rubber tissue or rolled rubber tissue alone, was used exclusively in all cases and the drain was placed at the source of infection only. When the coils of bowel infolded on the drain so that its course became tortuous, then two or three were sometimes used in order that a straight free outlet or pathway along the lines of least resistance might be afforded the products of infection. The drain was always lifted about 1 inch at the end of the first 24 hours. When sloughing of tissues or fæcal fistula occurred the drains were replaced by clean ones. All drains were removed completely when secretions diminished to a small area of staining on the dressings or the amount came to a standstill. Gentle irrigation, under very low pressure, through a small soft catheter was used around the drain in those cases having thick solid discharges.

We believe that drainage takes place along the sides and about, rather than through the agent used. The principle involved was to provide and maintain an outlet for the proper period of time. Drainage agents that are soft and flexible are less liable to make pressure along their course; therefore, the cigarette type we consider preferable to tubes having a more rigid character.

In the 263 cases of peritonitis there was found at operation localized peritonitis (varying from the mild fibrinous type to abscesses, gangrene of the bowel, leakage and soiling present in 209 cases). Five of this type died. The average duration of hospital stay in these cases was 23 days and the mortality rate was 2.3 per cent. In the remaining 54 cases there was found at operation a general diffuse suppurative peritonitis; 38 of these cases or 70.3 per cent recovered with an average hospital stay of 31.5 days, while 16 died giving a 29.6 per cent mortality. The life after operation of the total 16 cases who died was an average of 4.8 days, while a selected 11 cases from the same group lived only 1.7 days after operation. The mortality in the total of 263 cases of peritonitis local and general, all drained locally at the source of infection, was 6 per cent.

The question of surgical drainage of the peritoneum must remain to a certain extent an open one and dependent on the living pathology and other conditions present in the individual case. When all surgeons, either of one hospital group or everywhere, have acquired a like experience in peritoneal infections, then we may formulate definite standards to follow with regard to drainage. Situations of doubt must necessarily arise, and when these obtain, the writer believes it is safest for the surgeon to follow the old dictum of Lawson Tait: "When in doubt drain."

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

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SEPTEMBER, 1924

ACUTE INTUSSUSCEPTION

ACUTE intussusception is a very common condition, but it seems to occur in a rather sporadic fashion. Apart from cases of external strangulated hernia acute intussusception has accounted for about one-third of all the cases of acute intestinal obstruction that I have encountered.

During my service in the Meath Hospital, for 20 years, I had on an average four cases each year—my colleagues there, during the same period, had only about 10 cases between them. Since I transferred my services to Sir Patrick Dun's Hospital, 15 months ago, I have not seen a case, while my successor at the Meath Hospital has had 5 or 6 cases—indeed, he had two cases in one week.

The localities are very similar. There is a Lying-in Hospital in each area and the people seem to be as prolific in the one area as in the other, if one is to judge by the number of young children one sees in the streets. The class is much the same and I assume the food is not different. Possibly the practitioners in one area are more conversant with the signs of the condition than those in the other area, and recognize the trouble more readily.

The condition is met with most frequently in infants between the ages of 2½ months and 10 or 12 months—my youngest case occurred in an infant of 2½ months. It is occasionally met with (but with diminishing frequency) at all ages up to 70 or more. My oldest case occurred in a woman of 73 years.

The evidences in an infant are so typical that one has only to see one case, or, hear the phenomena described, in order to be able to make a correct diagnosis, and that, too, within a few hours after the onset.

An infant in perfect health—perhaps jumping with delight in its nurse's arms—is suddenly seized with a severe fit of crying—screaming in an agonized fashion would better describe it—which lasts for several minutes and then gradually dies away. It kicks its legs as it screams and a cold clammy perspiration collects on its face or pours off it. At the same time its face is pale and thus it is distinguished from the face of an infant merely crying from a fit of temper, as the latter's face will be flushed and certainly will not be bathed in perspiration. The fit of screaming dies away and is followed by a stage of exhaustion, during which the infant merely gives an occasional moan. Soon—10 to 30 minutes—the paroxysm of screaming is repeated and the child vomits—indeed, it may have done so during the first attack—flatus is passed, and there will be a bowel evacuation. Another stage of exhaustion for a varying period is followed by another paroxysm of crying (perhaps vomiting if the infant has had anything to drink), further passage of flatus, and perhaps another movement of the bowels.

Paroxysms of crying, vomiting, passage of flatus, and motions followed by exhaustion alternate for 6 to 12 hours, when blood and mucus will be passed per rectum. The paroxysms of pain are, of course, due to violent peristalsis, and it is during such a paroxysm that one can readily feel the typical sausage-shaped tumor as the violent peristalsis makes it more marked.

The infant must take a deep inspiration in order to continue its crying, which is merely a forced expiratory effort. During the inspiration its abdominal wall will become relaxed, and the surgeon's hand will then readily detect the tumor. The right iliac fossa may also seem empty as by that time the cæcum and ascending colon may have passed down to the transverse colon or further. I have twice seen the intussusceptum protruding through the anus and yet the intussusception was subsequently completely reduced, and both patients recovered.

In my experience the intussusception starts most frequently in the ileum about 1 or 1½ inches above the ileocæcal junction, but directly the involuted ileum reaches the ileocæcal valve the cæcum then becomes intussuscepted thereby forming a double or compound intussusception.

The dimple which is always seen on the intestinal wall at the site at which the intussusception starts, after reduction has been effected, has been found by me to be situated most frequently about 1 or 1½ inches above the ileocæcal junction.

I believe the symptoms are more severe in that type from the beginning as the circulation is more interfered with.

If one has any doubt as to the diagnosis, examination per rectum with the index finger of the right hand and with the left hand on the abdominal wall—if necessary under an anæsthetic—will clear up any doubt. It is possible in an infant thus to palpate the entire abdominal cavity from the liver and spleen downward. The woman of 73 years upon whom I operated was sent into hospital as a case of prolapse of the rectum, which a doctor stated he had reduced three times during the previous 24 hours. The house surgeon reduced it on admission, and informed me of the facts on my arrival soon afterward. Hearing the history I thought it advisable to make a rectal examination (I might here mention that examining a patient per rectum does not always mean getting to the bottom of the disease), when I found the typical os uteri condition about 4 inches up. On opening the abdomen directly afterward the intussusception was found to have started in the pelvic colon and was easily reduced, but, in order to diminish the risk of recurrence until œdema and congestion of the gut had subsided and especially at the site of involution, I had a tube passed through the bowel from below, which I anchored with a fine catgut suture about 2 inches above the site of involution. The result was most satisfactory.

I have only seen one condition which might be mistaken for intussusception on account of the abdominal pain, vomiting, and passage of blood per rectum, viz : Henoch's purpura, but the patient is generally older, viz.—3 or 4 years or upward, and purpuric spots will be seen—sometimes like flea-bites over its legs, arms, or abdomen.

The diagnosis of intussusception once made, the only satisfactory method of treatment consists in early operation and reduction by gentle expression from below upward. Care should be taken to see that the least dimple at the site of commencement of the intussusception is expressed. I have not seen any case recur after operation. My own mortality has been 3 deaths in 79 cases. In two of these cases resection had to be performed, while the

third death took place from convulsions on the tenth day after operation when the abdominal wound was soundly healed, and the child was considered fit to be taken home.

For some years past I have sent these cases home a few hours after they have recovered from the effects of the anæsthetic. The mother reports daily to the hospital as to the infant's progress or a student visits the case and reports to me.

I believe that this condition is one which requires greater gentleness in manipulation and greater rapidity in operating, if success is to be uniformly attained, than almost any other intra-abdominal trouble. Given an average case of less than 24 hours' duration I think the completed operation should not require more than 10 or 11 minutes to perform.

Early diagnosis and early operative interference will reduce the mortality from the figure at which it is generally recognized to stand today to less than 5 per cent.

SIR WILLIAM TAYLOR.

THE TECHNIQUE OF THE TONSIL OPERATION

SINCE Tydings first described tonsillectomy, in contradistinction to tonsillotomy, a little more than 20 years ago, many and varied methods have been advocated for the surgical removal of the faucial tonsil. Formerly the tonsil was operated on only when it was so large that it was thought to interfere with deglutition, breathing, and phonation. Since the work of Billings on focal infection has become known, the tonsil has assumed a far more important rôle in its relation to the general welfare of the patient. That it is an organ of importance in present day medical and surgical practice needs no argument. Certain advocates, however, may be said to be enthusiastic.

Because the faucial tonsil has proved to be an important portal of entry for infection, it has been necessary to devise a safe, complete, and surgically sound method for its removal, which does not disturb the function of the oropharynx. Numerous procedures have been suggested, and in all probability there are as many good methods of removing the tonsil as there are good operators on the tonsil. This statement implies that the principles of good surgery are followed, but that naturally individual adaptation of perhaps several suggested methods are combined in the hands of the surgeon.

In general, it may be said that operations on the tonsil are now being well done. Certain surgeons advocate local anæsthesia, and others will not perform the operation without general anæsthesia. Here again it seems to be only a matter of choice with the surgeon, for there are surgeons whose temperament does not permit them to perform the operation under local anæsthesia.

The spectacular "grandstand" operation on the tonsils is no longer regarded with favor. Present day sentiment demands that the operator shall control the bleeding in a surgical manner during the operation, that the operation shall be performed in a hospital, and that the patient shall be observed until there is no longer any danger of secondary bleeding. From time to time bloodless tonsillectomies are described. In a certain number of cases, with any operative technique, there will be little or no primary bleeding. Usually primary bleeding in tonsillectomy is due, not to the particular technique employed, but to the number and size of the blood vessels in the throat being operated on. The procedure is not a minor operation, although the mortality, considering the number of operations that are performed, is low.

H. I. LILLIE.

MASTER SURGEONS OF AMERICA

HENRY B. SANDS

DR. HENRY B. SANDS, a native of New York City, whose life span extended from 1830 to 1888, occupied a pre-eminent place in American Surgery during an epoch of wonderful surgical development; and he added much to surgical progress in this remarkable period.

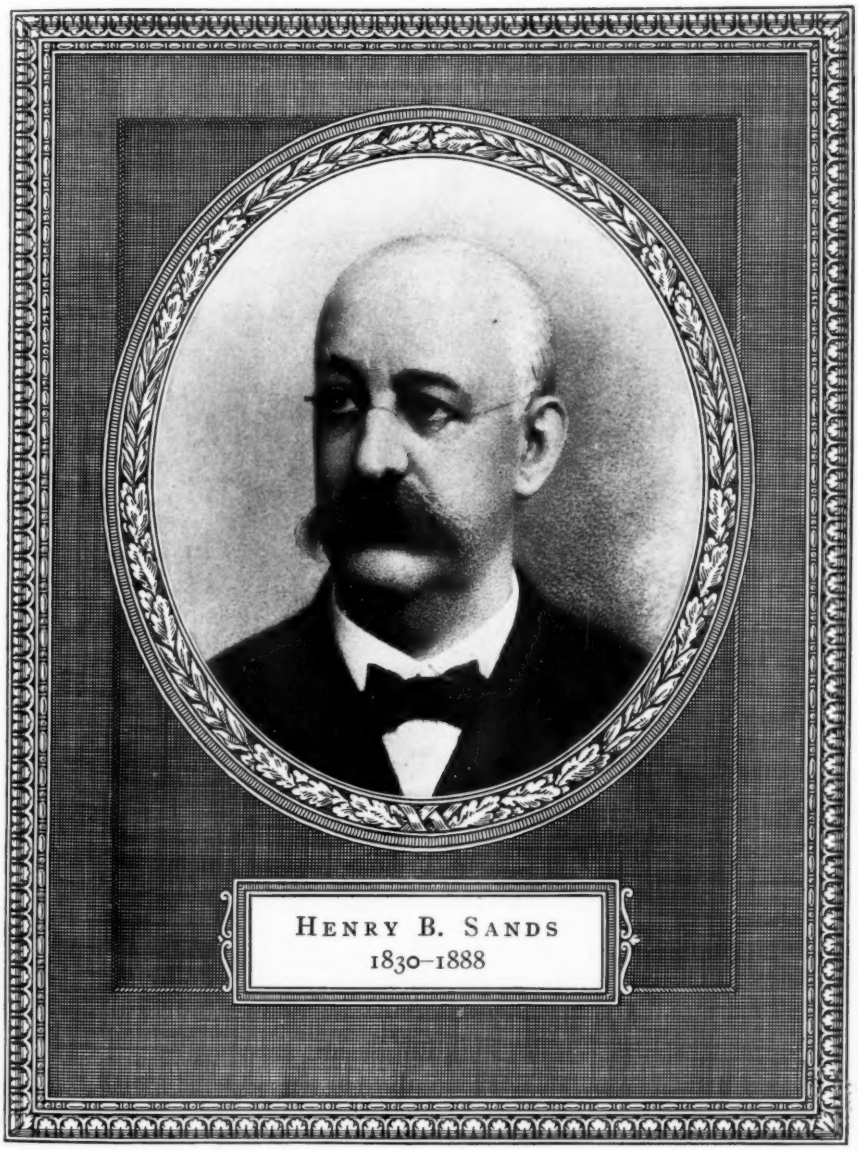
He was educated in the schools of his city and was graduated from the College of Physicians and Surgeons in 1854, served his interneship in Bellevue Hospital and then studied in Europe according to the custom of his time. For ten years he was a member of the emminent group of men whom Dr. Willard Parker gathered about him.

He was demonstrator of anatomy in the College of Physicians and Surgeons from 1854 to 1867, professor of anatomy from 1867 to 1879, and professor of surgery from 1879 to 1888. He was visiting surgeon to many hospitals, Bellevue, Charity, Mt. Sinai, St. Luke's, the New York Hospital, and the Roosevelt Hospital. He appreciated the disadvantages of the short terms of hospital service then in vogue, and finally obtained a continuous active service of more than 75 beds at the Roosevelt Hospital.

This was a notable service, one of the very best in the country. He gathered about him a particularly capable group of associates and assistants and maintained a model hospital organization. William H. Halsted, Frank Hartley, Richard Hall, and George Woolsey were among the surgeons whom he trained during this period. Many visitors came to his clinic. I well remember hearing Dr. William J. Mayo tell of going into the ward with Dr. Sands to see him aspirate an appendiceal abscess—a procedure which made a profound impression on Dr. Mayo and led him to treat radically similar conditions after his return home.

As a consultant, his judicial attitude, his great experience, his courage, his fairness and wisdom, and his warm and appreciative nature made him the leading surgical authority of our city for many years. In this capacity, Dr. Arpad Gerster states in his delightful memoirs that "he was a man according to my own heart" and that he never knew a man "who had more of what is called the courage of convictions."

As a surgical investigator and writer he considered many and diverse problems: hæmorrhage from the internal carotid artery, aneurism of the subclavian artery,



HENRY B. SANDS
1830–1888

nasopharyngeal polypi, tracheotomy, laryngectomy, excision of cords of the brachial plexus, internal œsophagotomy, intussusception, perityphlitis, peritonitis, various forms of urethral lesions and rupture of veins.

His most notable contribution to surgery was in the study of what we now call appendicitis. It is difficult for present-day surgeons to realize the problems of our surgical forefathers with regard to this disease. The pathological process existed then as it does now; but it had been studied late, either at autopsy after fatal general peritonitis had resulted, or at operation after so-called perityphlitic abscesses had formed. Hence, strangely enough, attention had been centered on the head of the colon and not on the appendix.

The secret of the real pathology was only hidden by the thickness of the abdominal wall, but the fear of penetrating the peritoneum prevented early operation. Dr. Sands, however, reasoned out the pathology and then did an operation which at that time seemed early. He had long been familiar with the work of Willard Parker, who in 1856 had introduced a definite line of procedure in the treatment of perityphlitic abscesses; and in 1880 Sands wrote a valuable article on the subject and gave histories of 15 cases. About 7 years later he stated that he had observed a large number of additional cases and announced his belief that the appendix was really the offending organ. As evidence of this he cited the existence of appendiceal concretions in perityphlitic abscesses and also stated that the attacks of pain in "perityphlitis" varied in their position much as the appendix varies in its position.

With these observations in mind he was called by Dr. Baruch on December 30, 1887 to see a case of acute peritonitis localized in the region of the perforated appendix. He saw the case 45 hours after the onset of symptoms, advised immediate laparotomy and performed the operation 3 hours later. The appendix had ruptured at its base, three concretions lay outside the place of rupture, and local peritonitis was present. He closed the opening, drained the local abscess, and the patient recovered. In reporting this case to the New York Surgical Society on February 8, 1888, he stated that he believed that it was the "first instance in which an early operation had been done for localized peritonitis due to a perforation of the vermiform appendix in which the operation had ended in recovery," and substantiated this belief by referring to Weir's recent tabulation of operations for perforating lesions of the intestine.

The publication of this case by Sands proved a tremendous incentive to prompt operation in cases of so-called perityphlitis, which were as common then as cases of appendicitis are now. If Sands could cure a case by an operation at a time which then seemed early, other operators believed that they could do the same; and McBurney, Bull, and others immediately followed his example. The pathology was found to be as Sands had stated it. The word appendicitis was coined and the modern conception of the disease was promptly accepted. In

thinking of Sands' work we must grant him much credit for this farsighted and courageous development.

Besides his professional ability Sands was a man of many interests. He was a musician of considerable ability, and a great lover of music. Even at the time of his death, which occurred suddenly in his carriage, he was returning to his home to an orchestral concert which was to be given there. He was interested in the arts. He had hosts of friends. He traveled much. He was a genial companion, a gifted conversationalist, witty, generous, and altogether delightful.

CHARLES N. DOWD.

CORRESPONDENCE

PREVENTION OF SUBUNGUAL HÆMATOMA

To the Editor: Dr. Guillermo Bosch Arana, in an article published in SURGERY, GYNECOLOGY AND OBSTETRICS for May, 1924, has given us a beautifully detailed technique for treating chronic subungual hæmatoma. I wish to describe here a simple little procedure which, if employed by everyone who banged his finger nail with a hammer, would leave Dr. Arana with no subungual hæmatomata to treat.

The hæmatoma beneath a nail is due, of course, to the escape of blood from traumatically ruptured capillaries. The blood escapes between the relatively soft tissue of the nail bed and the cornified layer or nail proper, the hæmatoma dissecting these structures apart as it spreads. The pain, aside from the pain of the trauma itself, is due to the pressure of the clot and the œdema following the injury.

Most people, receiving a blow or severe squeeze on a finger nail, either shake the finger with a vigorous snapping motion, swinging the arm violently, as we direct a patient to do when we want him to fill his veins so that we can find one to puncture; or with the other hand they grasp the finger or thumb just back of the nail and squeeze hard. Both manuevers are calculated to cause increased congestion and subungual bleeding, and simply make matters worse.

The proper thing to do when the nail is traumatized is to grasp it instantly between the forefinger and thumb of the opposite hand, the ball of the thumb exactly over the contused area, and squeeze with firm, even pressure, maintaining this pressure for from 10 to 15 minutes *by the clock*. The extravasation of blood from the ruptured capillaries into the contused tissue is thus prevented. At the end of 10 or 15 minutes the ruptured capillaries will have sealed themselves with tiny microscopic clots and the pressure on the nail may be released. Meanwhile the pressure will also have prevented the intercellular extravasation of serum and lymph which grossly constitutes the œdema of a traumatized tissue. So there is very much less swelling as well as an absence of gross visible hæmorrhage. Lastly, the pressure does help control the immediate pain. The end-result is a very moderately sore finger, from which all tenderness will have disappeared in a few days, and in place of an ugly and possibly painful hæmatoma there is at worst a very faint staining of the base of the nail. I have had several opportunities to test this out upon myself. So far it has worked well each time.

When the man with a hæmatoma consults you, it is a splendid time to describe the little trick to him so that he will remember it, and the chances are he will prevent the next one.

WILLIAM L. ROSS, JR., B.Sc., M.D.
Omaha, Nebraska

ATTENTION....FORMER ILLINOIS DOCTORS....ATTENTION

To The Editor: Will any and all doctors, former residents of Illinois, or descendants of pioneer physicians of the "Illinois country," communicate at once with the Committee on Medical History, Illinois State Medical Society, 6244 North Campbell Avenue, Chicago, Illinois?

Under the sponsorship of the Illinois State Medical Society there is in preparation *A History of Medical Practice in the State of Illinois* that must go to the printer at an early date. All possible assistance is asked from every source, as to personal data and experiences, including diaries, photographs, and similar documentary mementoes of pioneer Illinois doctors and of progressive phases of medical practice, as well as of achievements in fields other than those of medical science. Prompt return in good condition is promised for anything loaned the committee, the personnel of which is:

O. B. Will, M.D., Peoria
C. B. Johnson, M.D., Champaign
Carl E. Black, M.D., Jacksonville
George A. Dicus, M.D., Streator
George H. Weaver, M.D.. Wilmette, Ill.
James H. Hutton, M.D., Chicago
Charles J. Whalen, M.D., Chicago,—Chairman

The scope of the volume will range from the discovery of Illinois to modern times. Through this period of over 250 years there is much of thrilling interest to be detailed. Collection of the human interest data can come only from the families or closest friends of the pioneers, many of whom long ago removed to distant sections of the United States. Photographs especially are desired. Also copies of letters, statements of "cures" and "new methods," diaries, and the like.

TRANSACTIONS OF SOCIETIES

CHICAGO GYNECOLOGICAL SOCIETY

REGULAR MEETING HELD APRIL 18, 1924, DR. CHARLES S. BACON, PRESIDING

TWO CASES OF SPLENOMEGALY AND PREGNANCY

DR. EDWARD ALLEN: I wish to report two cases of splenomegaly and pregnancy. Because of the seriousness of the complications, and the fatal termination in one case, we think they should be reported in full.

At present there is much diversity of opinion as to the classification of splenomegalies. Some authors place all of them under the general heading of lymphocytomata, making only two subdivisions, the leukæmic and the aleukæmic. Others hold to the older classifications: Gaucher's disease, or large-celled splenomegaly; splenic anæmia, or Banti's disease; von Jaksch's disease; and the hæmolytic, or chronic jaundice.

In going over the literature I have been unable to find a case report of pregnancy complicated with splenic anæmia.

The first patient, age 17 years, entered the hospital April 18, 1917, with history as follows: Two years before during a physical examination a doctor found a small abdominal tumor in the left side. Since that time there has been a gradual increase in the size of the tumor, associated with mild abdominal discomfort. At this time the blood count was: leucocytes, 6,200; hæmoglobin, 65 per cent. Unfortunately, there is no record of red or differential count, although the attending surgeon says they were made and a diagnosis of splenic anæmia arrived at. There was no lymphadenopathy. At operation the spleen with a small accessory spleen was removed. Both together weighed 770 grams. (The normal spleen weighs between 125 and 175 grams.) The patient made an uneventful recovery.

She re-entered the hospital on April 26, 1922, for a gastro-intestinal disturbance and was discharged May 16, 1922, with a diagnosis of irritable colon and pregnancy. Her last period was February 4, 1922. The blood count at this time was: erythrocytes, 3,600,000; leucocytes, 19,400; hæmoglobin, 58 per cent. The red cells showed anisocytosis, poikilocytosis, microcytes, macrocytes, normocytes. The differential count was mononuclears, 4; large lymphocytes, 2; transitional cells, 1; neutrophile polymorphonuclears, 81; basophile polymorphonuclears, 1; neutrophile myelocytes 11. The myelocytes in this case can best be explained by the work of Pearce, Krumbhaar, and Frazier in which they found that several animals out of a series of splenectomized dogs developed subsequent myelocytosis.

The patient went through an uneventful pregnancy except for slight gastro-intestinal upsets. She re-entered the hospital November 19, 1922, in active labor. Pains began 8 hours before, but were still irregular and weak. When we saw her, pains were only every half hour, and 3 minims of pituitrin were given without appreciable effect. Two hours later with the cervix well effaced and the os about one-quarter dilated, the membranes were ruptured artificially further to stimulate pains. Pains became a little stronger, but at 9:30 a.m. 3 minims more of pituitrin were given to increase the effectiveness. One-half hour later the head came down to the perineum. Cervix could still be felt, but dilatation was almost complete. The cervix was slipped over the head during a pain by Dr. Heaney and low forceps applied. One ampule of pituitrin was given as soon as application was completed because in her condition postpartum hæmorrhage was feared. A normal female infant was delivered in good condition. The placenta did not separate and was removed manually. It was adherent over about three-quarters of its surface. The duration of labor was 16 hours. No lacerations of the cervix were present, but as the cervix was being inspected, the patient suddenly became cyanotic, took a few gasping respirations, and died on the table. Postmortem was not allowed by the family. Delivery was done under gas-oxygen-ether anæsthesia. At no time during our period of observation did the patient have any evidence of lymphadenopathy, icterus, or ascites.

Second Case. The patient, age 28, was admitted to the surgical division of the Presbyterian Hospital August 14, 1922, complaining of evening rise in temperature, and a tumor mass in the abdomen which had caused a noticeable increase in the waistline for the last month. On physical examination there was no adenopathy. A large tumor mass in the region of the left kidney was firm, smooth, and not tender. The blood picture at this time was: erythrocytes, 4,790,000; leucocytes, 7,200; hæmoglobin, 80 per cent; polymorphonuclears, 81 per cent; lymphocytes, 12 per cent; large mononuclears, 6 per cent; eosinophiles, 1 per cent. The Wassermann was negative, and the blood chemistry normal. A possible kidney lesion was diagnosed and laparotomy per-

formed August 19, 1922. When the abdomen was opened, they found an enlarged smooth spleen extending down to four fingers above the iliac crest. Recovery was uneventful and the patient was dismissed at the end of 2 weeks. She was re-admitted October 9, 1922, with a blood count as follows: erythrocytes, 3,930,000; leucocytes, 6,700; hæmoglobin, 74 per cent. The differential count showed no change in the reds; small lymphocytes, 15; large lymphocytes, 12; large mononuclears, 4; transitional, 8; polymorphonuclears, 61. The medical service made a diagnosis of an aleukæmic splenic anæmia and began to give her short treatments of X-ray. The white count taken 24 hours after the X-ray treatment was 5,800. Examination showed a 3½ months' pregnancy, last period being July 11. The patient had had a previous pregnancy 2 years before which was normal except for a trace of albumin in the urine during the last 4 weeks. She had a 28-hour labor, right occipitoposterior presentation, which was terminated with low forceps. There was no hæmorrhage. The present pregnancy was uneventful except for persistent fatigue. The blood pressure and urine were normal. She received 3-minute X-ray treatments every 3 weeks during the term of pregnancy. She re-entered the hospital in active labor April 3, 1923, and gave birth to a 5 pound, 8 ounce baby after 7½ hours of labor. There were no lacerations. The placenta separated spontaneously at the end of 15 minutes, came down into the vagina, and was delivered normally, and was intact. The patient had nitrous oxide for the perineal stage. She was given an ampule of pituitrin as soon as the placenta was delivered and there seemed to be less than the normal amount of bleeding. Two hours after delivery the interne was notified that the patient was bleeding more than normal. An ampule of pituitrin and aseptic ergot were injected, also a drachm of fluid extract of ergot was given by mouth. The bleeding continued and 2 hours later another ampule of aseptic ergot was given. Pituitrin was repeated in 1 hour. The pulse at this time was 102. Two hours later the patient was still bleeding and the uterus was explored and the walls found clean. The uterus was packed with gauze. There was no material increase in the bleeding. In about an hour the blood began to come through the uterine pack. The pulse had risen to 120. The blood count immediately following delivery was: erythrocytes, 2,000,000; leucocytes, 4,000; hæmoglobin, 65 per cent. The blood pressure was 140-80. The hæmoglobin went down to 50 per cent in the next two hours. She was given 40 cubic centimeters of whole blood deep in the muscles of the thigh. Another ampule of pituitrin was given. Fourteen hours after delivery the blood count was: erythrocytes, 1,560,000; leucocytes, 7,300; hæmoglobin, 40 per cent. Bleeding was not profuse but continuous, so a portion of the pack was removed. The next morning, the pulse was of a better quality, but still 120-30 and the patient seemed very weak. At this time the blood count was: erythrocytes, 1,300,000; leucocytes, 8,800; hæmoglobin, 35 per cent. She was given 125 cubic centimeters of whole blood intravenously with marked reaction. The patient went through severe shock, developed a marked œdema about the lips and throat and looked as though she would not last out the hour. Normal salt, 450 cubic centimeters, was given intravenously and the patient sent back to bed. The condition gradually improved and in the afternoon the blood count showed: erythrocytes, 1,710,000; leucocytes, 5,000; hæmoglobin, 40 per cent. The differential made at this time was: lymphocytes, 26; transitional, 6; polymorphonuclears, 62; eosinophiles, 2. The patient continued to have a bloody vaginal discharge, but no active hæmorrhage, for several days. The blood count went steadily downward until 6 days after delivery when she had erythrocytes, 950,000; leucocytes, 3,000; hæmoglobin, 20 per cent. A week after delivery she was given 500 cubic centimeters of whole blood intravenously with very little reaction. Temperature went up to 102.6. That evening the blood count was: erythrocytes, 1,320,000; leucocytes, 4,000; hæmoglobin, 28 per cent. One week later she had another blood transfusion and by the next day the blood count had gone up to: erythrocytes, 2,180,000; leucocytes, 3,400; hæmoglobin, 43 per cent. The differential count at this time showed: anisocytosis, poikilocytosis, no nucleated reds; large mononuclears, 6; lymphocytes, 4; transitional, 9; polymorphonuclears, 80; myelocytes, (?)1. On May 6, 1923, the blood count was: erythrocytes, 3,080,000; leucocytes, 5,000; hæmoglobin, 65 per cent. The patient was discharged May 10, 1923. The blood count and differential on the baby were normal. The menstrual periods began at the end of 3 months, normal in amount and with no disturbance. Extreme fatigue and a few mild intestinal upsets occurred during the puerperium.

The patient re-entered the hospital November 27, 1923, with the following history: last regular period, October 12, which was 2 days early, the previous period being September 16 and normal. The blood count at this time was: erythrocytes, 3,870,000; leucocytes, 8,200; hæmoglobin, 75 per cent. The blood pressure was 110-70. The differential count was: small lymphocytes, 22; large lymphocytes, 7; transitional, 2; polymorphonuclears, 70. Vaginal examination showed the uterus enlarged to the size of a six weeks' pregnancy. An incision was made in the anterior vaginal wall, the body of the uterus was pulled forward and the ovum removed by opening across the fundus. The uterine ends of the tubes were excised as sterilization seemed indicated in her condition. The patient had an uneventful convalescence. She re-entered the hospital December 22, 1923, for splenectomy. The spleen was removed with some difficulty due to adhesions along the dome of the diaphragm. The spleen weighed 885 grams. No lymphadenopathy or liver changes were found. The blood at this time showed: erythrocytes, 4,940,000; leucocytes, 7,400; hæmoglobin, 70 per cent. The blood pressure was 130-70. No differential was made.

Microscopic sections of the spleen showed a marked increase in the connective tissue elements with a decrease in the size of the malphigian corpuscles. Scattered through the sinuses were many large cells with deeply staining nuclei. Diagnosis of splenic anæmia was made by the house pathologist. With the exception of a low-grade temperature, the patient had a good convalescence.

INSULIN TREATMENT OF THE TOXÆMIC VOMITING OF PREGNANCY

DR. WILLIAM THALHIMER read a paper entitled "Insulin Treatment of the Toxæmic Vomiting of Pregnancy." (See August issue of this Journal, p. 237.)

DISCUSSION

DR. SOLOMON STROUSE: I do not want to heap praise on Dr. Thalhimer but it is very striking, especially to men who have been trying to work in metabolism for a long while, to have Banting, a surgeon, discover insulin and to have Thalhimer, also a surgeon, discover its use in the vomiting of pregnancy. You may not know that Thalhimer announced that he had gotten insulin-like substances from the vegetable kingdom, especially from the potato, before such findings were published by Collip of the Toronto group.

In the first part of the paper I can see nothing to criticize and certainly nothing to add. The thought has occurred to me that although the kidneys bear the burden in late toxæmias, the primary derangement may be somewhere else, possibly in the liver. If it is in the liver it might be that insulin properly used might be of help.

Regarding Dr. Thalhimer's theorizing about primary carbohydrate derangement in pregnancy, I am going to take the liberty of saying that while the theory is interesting I do not think the facts brought out by Dr. Thalhimer are more than suggestive. Taking it up point by point, he spoke about the early diminution in the alkali reserve as being an indication of derangement of carbohydrate metabolism. I do not think this statement is scientifically correct, because the diminution in the alkali reserve that occurs in acidosis following derangements of carbohydrate metabolism is quite a late manifestation; that is, it occurs only when the derangement of carbohydrate metabolism has gone so far as to produce acidosis. If a diminution in the alkali reserve exists in pregnancy it would seem to me that it would indicate some other type of primary acidosis not due to carbohydrate disturbance.

The second point on which I differ is in regard to the glucose tolerance test. Dr. Thalhimer knows as well as I do that diminution in glucose tolerance is found in cancer, tuberculosis, arthritis, etc. One can hardly infer a *primary* disturbance in carbohydrate metabolism from lowered glucose tolerance.

The third point, the prolonged acetonuria, I think he has overestimated. In diabetes after clearing up of the clinical signs of acidosis there is often persistence of acetone. Some diabetics will run acetone without any clinical signs of acidosis.

The fourth point, the early development of the pancreas, sounds very interesting. Dr. Thalhimer just mentioned that the pancreas developed in the fetus at the third or fourth month and coincidentally at that time the pernicious vomiting of pregnancy appears, but the amount of carbohydrates that would be deviated from the normal metabolism by the fetus would be very small and it is hard to conceive of that as being fundamentally at fault.

On the whole, as interesting as the second part of Dr. Thalhimer's paper is, it seems to me that one should not lose sight of the fact that we may still be dealing with some unknown intoxication. I should like to know why vomiting begins as soon as the ovum is fertilized. It has been suggested that a specific protein intoxication may occur. If that is true can anyone give statistics on people who are married more than once?

DR. CARL HENRY DAVIS, Milwaukee, Wisconsin: Relative to the suggestion of Dr. Strouse, I lost the second wife of a man who had two successive wives die of eclampsia. The last baby lived and has been perfectly healthy.

Dr. Thalhimer has, through a logical deduction made a real contribution to the management of the very severe vomiting of pregnancy. In 1914, Hasselbalch and Gammeltoft reported finding an acidosis before labor which soon disappeared after delivery. Emge at the University of California, in 1916 demonstrated with the Van Slyke method that practically all pregnant women have a reduced carbon dioxide tension. In 1920 I had the blood of women with vomiting of pregnancy examined and all showed a reduced reading. The lowest was 28, and a week later this patient aborted. I believed the death of the fetus resulted from the acidosis.

Most of the cases of pernicious vomiting are apparently due to neglect. Unless there are severe complications good results may be expected from the use of glucose solution and relatively large doses of bromides. In the milder cases a 3 per cent glucose containing sodium bromide may be given per rectum. The dehydrated requires much larger amounts of fluid than will be absorbed per rectum and the glucose may be given intravenously or normal salt solution may be given under the breasts.

Dr. Thalhimer reports that one of his patients had been given daily doses of morphine before she came to the hospital. This, I have found is frequently the history in such cases, and the treatment always tends to increase the vomiting. The nervousness is best controlled by bromides.

While following the cases treated by Dr. Thalhimer, I was impressed with the rapidity with which the insulin caused a break in the vicious cycle, correcting the acidosis and making possible dietetic management. Insulin treatment will, I believe, eliminate the occasional necessity for therapeutic abortion in this type of case.

As stated by Dr. Thalhimer, we used glucose intravenously with insulin in the treatment of a very severe toxæmia with convulsion which followed an acute cold at 5½ months. While this treatment raised the alkali reserve ten points, my associate, Dr. Cron, and I feel that the patient's recovery after some 45 hours of coma was due largely to the use of opiates and continuous lavage of the entire gastro-intestinal tract by means of stomach tube and high rectal enemata for a period of about 18 hours. The patient was given large doses of magnesium sulphate and sodium bicarbonate through the stomach tube. She was also bled.

Dr. Charles S. Bacon: I would ask Dr. Thalhimer if he has considered any of the methods of testing out the functional capacity of the liver. We have been told that the liver is not the sole but just a very important factor in glucose metabolism.

Dr. N. S. Heaney: I would like to ask a question or two. Dr. Strouse suggested that there might be a doubt in his mind as to whether there is frequently a disturbance of carbohydrate metabolism in pregnancy. The fact that so many cases have persistent glycosuria which usually disappears as soon as pregnancy is over would seem to leave no doubt regarding this.

As Dr. Thalhimer was talking, I tried to remember whether I ever saw a case of pernicious vomiting which showed sugar in the urine and just from memory I would say that I have never seen a case of much nausea in which there was glucose present in the urine. Would this coincide with Dr. Thalhimer's theory of pernicious vomiting?

Dr. J. L. Baer: In the unavoidable absence of my colleague, Dr. J. Lackner, I want to report a case I saw with him last year shortly before he left on vacation. It was a typical case of uncontrollable vomiting. Dr. Lackner had tried all of the then accepted methods of treatment including organotherapy, sedatives, rectal feeding, and the Rehfuss tube method. He and I agreed at the time that unless the vomiting ceased within 24 hours pregnancy would have to be terminated, which I did. He recently had the same patient in the hospital in her second pregnancy starting the same vicious circle. He administered one dose of insulin and glucose intravenously and the patient is now in excellent condition, taking nourishment and going on to a recovery.

Dr. Carey Culbertson: Inasmuch as the results in these cases have been so favorable it suggests the use of this method in the ordinary nausea and vomiting of pregnancy. I was going to ask Dr. Thalhimer why insulin would not be indicated in the ordinary nausea and vomiting which has not become uncontrollable or excessive. That is one of the *bêtes noires* of obstetrics as all physicians and pregnant women know, one of the things that they dread on becoming pregnant, having to spend 2 or 3 months with gastric distress.

I agree with Dr. Davis that the so-called uncontrollable vomiting of pregnancy is largely due to neglect. A patient should not be allowed to vomit, but it strikes me that the use of insulin might be applicable to the ordinary nausea and vomiting of pregnancy.

Dr. N. S. Heaney: Regarding a suitable term, inasmuch as uncontrollable and excessive are not satisfactory, why not go back to the first term hyperemesis gravidarum.

Dr. William Thalhimer, Milwaukee, Wisconsin, (closing the discussion): In the administration of the insulin we arrange a gravity bottle on a board and alongside of it have a 10 cubic centimeter burette with two stopcocks and a Y-tube joining the two. We fill that apparatus with a solution of glucose. We have found it convenient in the hospital to fasten the apparatus to a board. This can be wrapped in a sheet and sterilized in the autoclave and is always immediately available. Water seeks its level as soon as the solution is running correctly. One stopcock is shut off and the fluid immediately begins flowing through the burette. With the stopcock you can calculate exactly what you are giving. The fluid in our container flows so slowly when the glucose is coming slowly that you can determine the rate. We have a number of times given as little as 200 cubic centimeters an hour for a period of 5 hours and checked it up accurately within 10 or 15 cubic centimeters. By this means the solution can be given slowly without embarrassing the circulation. The insulin can be given in divided doses, so that glucose is running in after the last dose of insulin. Thus the danger of hyperglycæmia from the insulin is diminished. Thirty units of insulin are given. The glucose is allowed to run in for an hour and then 20 units of insulin is given, followed an hour later by the 10 additional units, so that by the first 2 hours of the administration all the insulin the patient is going to get will be given. By this method we never have insulin reactions. Especially in non-diabetic patients insulin should be given very carefully. When we start we insist on having a sterile hypodermic full of adrenalin in the room so we can give the adrenalin if necessary. A hypoglycæmic reaction occurred in one patient who received 1000 cubic centimeters of glucose solution and 30 units of insulin.

In answer to Dr. Strouse's criticism I would like to say just one word about the changes in the alkali reserve and the effect on glucose metabolism. Loevenhart and his co-workers at the University of Wisconsin have definitely demonstrated that you get changes exactly comparable to these vomiting cases if you cut down the oxygen supply. You have eliminated glucose, you cut down the oxygen supply and the patients cannot burn it. They develop a diminished alkali reserve and develop a lowered hydrogen-ion concentration in the blood which interferes with carbohydrate metabolism.

As for the return of acetone in the urine of these patients a number of hours after the insulin has been given it is true that when diabetics are rendered sugar-free by insulin the acetone disappears and when

you find acetone in these cases you always find sugar. Therefore there is undoubtedly some relationship. The delayed excretion of acetone will not completely account for that.

So far as the amount of carbohydrate that might be needed by the fetus is concerned, I think we can only imagine. We know, for example, that glycolysis, which is the conversion of glucose into lactic acid in the body, occurs quite rapidly. As for this tissue growing in the uterus, we do not know the amount of glucose which will be needed to nourish it. Also we do not know how much glucose is going to be needed to furnish energy for growth. We have finished the first stage of an investigation at Columbia Hospital on the effect of insulin on tissues *in vitro*. We found when we added insulin to the medium in which these tissues were growing they grew 50 per cent more rapidly than when insulin was not present, also that the amount of glucose which is used up in that medium is in some instances three times as much. Where we have small specks of tissue the size of a head of a pin, we used up enough glucose from our medium so that we could detect it with the blood sugar method. In that way we are trying to find out something additional about the mechanism of insulin.

So far, we have not tested the functional capacity of the liver. I think there might be a question as to whether a satisfactory test for liver function has yet been devised.

As for glycosuria of pregnancy and its absence in the pernicious vomiting cases, as mentioned by Dr. Heaney,—just exactly what glycosuria of pregnancy means I do not know. I think we have demonstrated that the yeast test for glucose is unsatisfactory. In some of our pernicious vomiting cases we have had high normal blood sugars. The fact that you do not get sugar in the urine with abnormality of the carbohydrate metabolism might indicate that an excessive amount of carbohydrate is produced and that is why there is no change in the amount in the urine.

As far as the ordinary case of vomiting of pregnancy is concerned, we have felt that this work has been at a stage where it had to be tried only in the severe cases. If insulin is used, I think it should be carefully controlled and that the proper amount of carbohydrate food is given for even a small dose of insulin. As far as I have been able to work out, almost any individual can stand 5 to 10 units of insulin if given some carbohydrate shortly afterward, without there being any serious danger; but I should say that the normal patient should be controlled in the hospital where she can be watched and properly nursed. And when you once do that, you have introduced a psychological factor and you cannot tell which is producing the result. Since a great deal has been found out about planning the diet in diabetes and seeing that a proper ratio is established, more attention might be paid toward planning the diet of the normal pregnant woman, seeing that she gets not too much fat and not too much protein, because the amount of protein needed by anybody is very moderate.

FIBROIDS IN THE PUERPERIUM

Dr. E. W. Fischmann presented a paper entitled "Fibroids in the Puerperium." (See p. 327.)

Dr. Rudolph W. Holmes: Dr. Fischmann has presented a most valuable, in fact, an encyclopedic discussion of the pathological changes of uterine fibroids in the puerperium. We must concede the correctness of his presentation of facts, but we do not believe that these fibroids occur frequently. On the contrary, in my experience degenerative changes or influences which work deleteriously to the puerperial woman are of a very negligible frequency.

Fibroids of the uterus are of rather common occurrence in the pregnant. We frequently are able to palpate small fibroids which increase in size with the advance of gestation, and involute with the involution of the uterus. Large fibroids, on the other hand, are of comparative rarity.

My first experience with a large fibroid occurred many years ago. I saw a primipara of about 20 years of age who had been in labor with a tumor the size of the fetal head filling the pelvis. The baby was dead. A cæsarean section was done. The woman absolutely refused any mutilation which might preclude further pregnancies, saying that as she had conceived once, she could again. Within 3 months the tumor was no longer palpable.

Again, I had a fundal tumor in a patient in labor—this was discoid, the size of a dinner plate. Some months postpartum I removed her appendix; her tumor had contracted to the size of a garden pea.

I may sum up my sentiments by saying that a fibroid, no matter where it is located, is no indication for operation in pregnancy so long as it does not arouse symptoms. When complications arise, irrespective of the time of pregnancy, operation may be indicated. In labor, the method of attack must be dictated by the location of the tumor. If not in relation to the brim, usually it may be left, and delivery of the child accomplished from below. In the puerperium, the wise course is to operate immediately if symptoms supervene. In their absence, delay should be the rule until time proves that involution is not to be realized; a removal in the puerperium may spell extensive mutilation. When removed late, a myomectomy may vouchsafe further children.

From an obstetric point conservation should be the rule.

Dr. C. W. Barrett: This case was seen in consultation by me and the fibroid was very apparent. Conservatism was advised because it seemed that the patient would not live through an operation at this time.

I have seen a number of cases where fibroids have produced abortion which was followed by suppuration or abscess of the fibroid. It is a very common thing to see a fibroid suppurate. I recall one patient, the wife of a doctor in this city, who was delivered

of a premature child in the seventh month, after which as soon as she was in condition I operated and found a large fibroid which had suppurated. In the past year another patient had a fibroid which began to grow rapidly and X-ray treatments were used. Following the X-ray treatments the patient aborted. As she continued to have hæmorrhages, the uterus was cleaned out with the hope that a better time could be found to do the operation for removal of the fibroid. That proved to be true. Upon operation we found a fibroid with an abscess inside of it.

We occasionally do see fibroids reduce greatly in size but I think if they do disappear it is the exception. I think more of them suppurate than disappear.

DR. CAREY CULBERTSON: Just one point struck me as being worthy of comment: that is the presence of the tumor along with its degeneration and suppuration and the calcification of a small area. We know that calcification of a fibroid depends upon an aseptic state and cannot occur in the presence of suppuration. I think that Tarnowsky some years ago made that clear and explained why. Therefore, my idea is that in this tumor the calcification was already present and did not occur during the puerperium. It takes a long time for calcified areas to form and in this tumor the change must have occurred prior to the pregnancy whereas the suppuration was, of course, the result of infection subsequent to the delivery.

I think that as far as the management of fibroids in pregnancy. labor, and the puerperium is concerned the conclusions laid down by Landau in his very elaborate monograph of ten years ago sum the matter up about as well as has been formulated.

DR. N. S. HEANEY: I have nothing to add to Dr. Fischmann's paper except that I cannot let the paper go by without remarking on the astuteness of the pathologist who was able to tell by microscopical sections of the fibroid that the inflammatory reaction had lasted for only 4 or 5 weeks.

DR. J. L. BAER: I regret the necessity for criticizing one of the very important conclusions drawn in an otherwise excellent paper, namely, that a cæsarean section is the proper procedure when a fibroid is discovered in labor. I believe that is fundamentally wrong. Cæsarean section is indicated only under special circumstances, more particularly depending on the position of the fibroid and its bearing on the progress of labor.

I regret likewise the necessity for differing very radically from the position of my friend, Dr. Barrett. In my experience fibroids very *uncommonly* suppurate. They follow a rather routine course of growth and retrogression and the necessity for interference is unusual rather than usual.

DR. C. E. PADDOCK: I have had an experience of several thousand obstetrical cases and I never saw but one case with fibroid that came to me late in pregnancy that caused any serious trouble or required an operation. I see quite a number of cases of fibroid complicating pregnancy but I never had to operate on a case or do a hysterectomy or any serious operation because of that fibroid.

DR. MARK T. GOLDSTINE: I would like to have the essayist elaborate a little more on how the expulsion of the fibroid would cause an inversion of the uterus. It is rather unusual for a uterus to invert unless pulled on or pushed on by the forceps.

DR. E. W. FISCHMANN (closing the discussion): Dr. Holmes has been exceedingly fortunate to have seen all fibroids shrivel up and disappear uneventfully after labor.

Dr. Baer unquestionably is correct when he stamps the recommendation of cæsarean section and myomectomy for all fibroids complicating labor as radical. But it seems the safest way of avoiding the unpleasant complications during labor and the sequelæ postpartum.

Calcification is most commonly seen in aseptic fields as Dr. Culbertson well states, but it does occur in suppurating mesenteric glands in typhoid and tuberculosis. My sections showed the calcified areas to be most common around the areas of fatty degeneration of the myometrium.

Dr. Heaney's query I must answer with Dr. Jaffe's statement that where the calcification occurs in the parenchymatous tissue as here in the myometrium and where many muscle fibers stain fairly well and retain their nuclei in various stages of disintegration, the degenerative changes are due to lack of blood supply and are of recent origin.

Inversion of the uterus is caused by the contractions of the uterus upon the fibroid within it, which acts as a foreign body.

I heartily agree with Dr. Goldstine that by applying the forceps to the tumor, I might have caused inversion. But I found the tumor fairly unattached and had inversion occurred, I would have replaced it as did the authors cited in my paper.

THE SURGEON'S LIBRARY

OLD MASTERPIECES IN SURGERY

By ALFRED J. BROWN, M.D., F.A.C.S., Omaha, Nebraska

THE AUGENDIENST OF GEORGE BARTISCH

THE great advances made in surgery during the early part of the sixteenth century by von Gerssdorff, Paré and others, together with the progress in anatomical knowledge for which Vesalius was mainly responsible, naturally stimulated study and observation in branches other than general surgery. Because of the prevalence of disease of the eye and the horror of blindness, that organ made a direct appeal to George Bartisch (1535 to about 1606) who describes himself as citizen, oculist, cutting (Schnit) and wound physician of Konigsbrueck near Dresden. Bartisch had evidently, from the preface of his book, made a study of the Bible to locate the passages in which the eye and particularly blindness were mentioned. From the Old Testament he got the idea that blindness was a visitation of God for sin. From the New Testament he gathered that this could and should be cured, for he paraphrases the miracle of restoring the sight of the blind man (John IX) in an ornamental page preceding the list of testimonials which he submits to the reader. Consequently Bartisch lays great stress upon the moral conduct of both patient and surgeon in the care of eye diseases. In addition he was impressed with the power of incantations which he used to ward off the interference of evil spirits in his work and, fearful lest others might use incantations against his patient or himself, he employed amulets of various types which the patient should wear. Some of these are illustrated and though we may not believe in their efficacy we must admire their beauty of form and artistic value. That Bartisch would choose amulets of an artistic type is natural for he laid great stress upon the general education of the physician as well as insisting upon the greatest possible technical dexterity and even the use of both hands, for he advocates travel for the physician and also the practice of drawing and painting. It is fair to assume, therefore, that he was acquainted with what was good in art and chose his materials accordingly.

Hemmed around by superstition and struggling under this handicap, Bartisch, nevertheless, made the greatest advances in ophthalmology that had been made up to his time and put forward his methods and results in a book published in 1583, under the title of *Ophthalmologleia* that is Eye service—'ΟΦΘΑΛΜΟΛΟΓΛΕΙΑ Das ist Augendienst." He then goes on to state that the book is a compilation of his own results in infirmities, injuries, and diseases of the eye. It is dedicated to Augustus, Duke of Saxony and the short dedication is followed by a rather lengthy preface in which Bartisch freely states his opinion of the practice of treating eyes of the time and the opinion is far from flattering.

Following the preface Bartisch gives several pages of case reports in the form of testimonials vouched for by the patient or relatives. The influence of the spiritual is again shown in the heading of the title to the testimonials which is a reference and translation of Matthew IX—12, "But when Jesus heard that, he said unto them, they that be whole need not a physician, but they that are sick."

The first part of the ophthalmology proper consists of a discussion of the relation of man to the firmament and the four elements, earth, air, fire, and water, which he believed had a great influence on the treatment of the eyes. Throughout the work he advises oculists to see that the proper astrological formulæ are used in their treatment.

The anatomy of the eye is carefully described and both the brain and the eye are illustrated by a series of superimposed plates showing the relations of the various parts to one another. In his plate of the muscles he shows the four recti but apparently did not know of the two obliques.

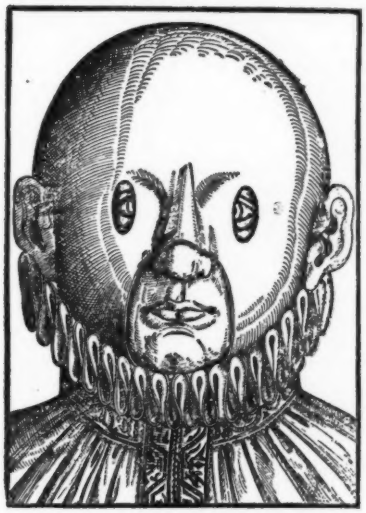
The remainder oi the volume treats of diagnosis and therapy. It is beautifully illustrated by wood cuts of various pathological conditions, operative procedures, instruments, and amulets. Bartisch did not believe in spectacles and though he illustrates them, warns against their use, preferring to trust in amulets, prayers and incantations. For squint he uses different forms of masks with holes cut in proper position to make the patient bring the eyes to normal position in order to see; an ingenious procedure but liable to be very uncomfortable in hot weather.

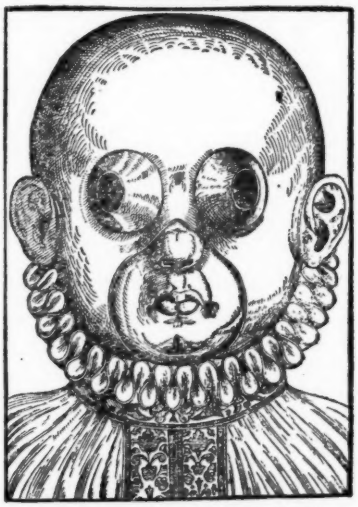
Bartisch was also an operator and believed in the use of the seton which he advocated in pannus, pterygium, entropion and ectropion and many other conditions. He divides cataract into white, gray, blue, green, and yellow and needles them and depresses them through the sclerotic.

Bartisch was very insistent upon proper after-treatment of his operative cases, a most unusual thing for this time, and gives detailed directions and prescriptions to be carried out. His work placed him far above other oculists and deserves to be considered the greatest work on diseases of the eye published up to his period.

In dem Andern Teil wird angezeiget vnd beschrieben / von den mängeln vnd gebrechen der Augen / so angeerbet vnd von Mutter leibe angeboren werden / Als schielen / vberschieckt / vnnatürliche kleine enge Augen / auch vnnatürliche groß weite Augen / Vnd so eine vnnatürliche vbel vnd auffsendige farbe an wesſen der Augen sey.

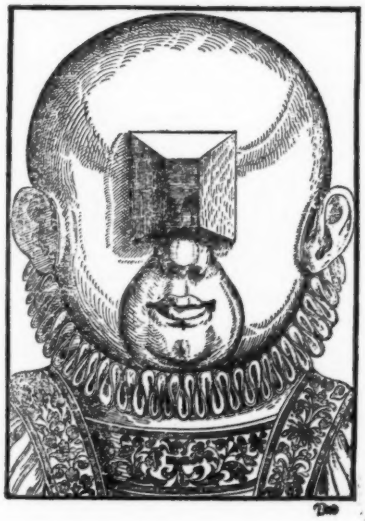
nach dem liecht drehen / kurtz / werden vnd richten müsse / es sey bey Tag oder Nacht / abermassen / wie diese nechst nachfolgende Contrafactur vnd Figur augenscheinlich anzeiget.





Verwendet aber ein Kind die Augen auswarts gegen den Ohren oder Schläffen / so muß man dem Kinde auch eine sonderliche Kappe oder Kugel machen / dieser gestalt / das sie vornen lang herauß gehe / als ein Stirnhut / die sol daſelbsten eine langlichte

spitze haben / dardurch das Kind sehen möge / wie diese nachfolgende Contrafactur vnd Figur thut anmelden / daran mehr zu sehen vnd zu verstehen ist / als wann man drey oder vier Bogen voll schriebe.



REVIEWS OF NEW BOOKS IN SURGERY

MANY costly mistakes have been made at the outset in organizing and establishing institutions for the care of the sick. Frequently the efforts of overenthusiastic individuals, whose hearts are right, are misguided by lack of experience. The pitfalls of hospital construction and organization are many.

Mr. J. J. Weber's recent book entitled, *First Steps in Hospital Organization*,[1] will help to avoid many errors. The choosing of a proper site, balancing of accommodation according to population, financing, general organization, and organization of various departments are all well discussed. Mr. Weber draws attention to the need for looking well to future requirements—expansion. He has pointed out the advisability of selecting at the outset a superintendent of sufficient experience and training so that his advice may be available during the period of construction. In the appendices are to be found many important details which are not only helpful but necessary. Mr. Weber does not leave his readers by simply saying that by-laws and agreements of various kinds are required, but he gives samples of these.

Mr. Weber's book will fill a great want in the hospital field and will be much appreciated by those who are planning the erection of new institutions.

ALLAN CRAIG.

THE hospital field will receive with interest, profit, and appreciation Mr. Frank Chapman's book *Hospital Organization and Operation*,[2] containing much valuable authoritative data and fundamental principles that can be applied in the administering of hospitals, large and small. This book crystallizes in a clear and logical manner the ideas of a successful and practical hospital administrator and reflects throughout the well tried experiences of the author.

The author, at the outset, wisely calls attention to the primary functions of a hospital. These are well summarized as follows: (1) the care of the sick; (2) the teaching of disease; (3) the study of disease. The carrying out of these functions affords the hospital a closely interwoven relationship with the activities of the community. The service the hospital renders is, however, basic. As he so aptly puts it: "One must not lose sight of the fact that a hospital is not an inert thing of brick and stone, but is an ideal of service."

The importance of well thought out organization and responsibilities is emphasized. Just as organization is necessary to industry, business or other enterprises, so also is it essential to successful hospital administration. Indeed the same principles apply in a great measure. Accompanying the discussion of organization the author submits a number of explicit charts by way of explanation. Mr. Chapman emphasizes the importance of giving sound thought to the personnel selected, especially the superintendent. This is well set forth in the author's own words: "The keynote of the arch of efficient hospital operation is a properly qualified superintendent." He is the person who is charged with the interpretation of policy as laid down by the trustees and the converting of it into wholesome action for the best care of the patient, as provided through the well articulated and co-ordinated composite activities of the hospital.

The greater portion of the book, especially Chapters II to XII inclusive, is taken up with the discussion of hospital departments, their organization and operation. Definite guiding principles are laid down, based on the essential theories and practices that indicate for the successful conduct of such departments there must be definite fixed departmental authority, with a department head responsible for the activities carried on therein.

The author definitely calls attention to the need and value of more uniform methods for recording and accounting generally. A need for the standardization of record and accounting forms is expressed. Many forms are submitted in the text, a number of which are recommended for use in hospitals by the Committee on Forms and Records of the American Hospital Association and others are now being used by the United Hospitals of the City of New York.

In Chapter XIII Mr. Chapman, realizing that the administrator of the small hospital may feel that much of the data in the previous chapters does not apply to the small institution, clearly interprets the principles he has laid down into practical application in the smaller hospital administration. He readily dispels any feeling that "all the idealism and all the mechanism outlined in this volume is fine for the larger hospital but is not applicable in any sense of the word to small hospital development." He shows clearly that the same identical principles are applicable in the hospital of ten beds as well as in that of five hundred beds.

Chapter XIV presents in a comprehensive, graphic, and illustrative manner many procedures of operation and a detailed explanation of—admission and discharge of patients; professional records; billing of patients; purchase and issuance; accounting; analysis of activities. This will throw much needed light on some of the more technical problems of hospital administration—professional, social, financial and statistical.

The closing paragraph in well chosen language sets forth the breadth of hospital service and the kind of spirit which should permeate its achievement.

[1] FIRST STEPS IN ORGANIZING A HOSPITAL. By Joseph J. Weber, M.A. New York: The Macmillan Company, 1924.

[2] HOSPITAL ORGANIZATION AND OPERATION. By Mr. Frank Chapman, Director, Mount Sinai Hospital, Cleveland, Ohio. New York: The Macmillan Co., 1924.

The author says in part: "The hospital in its truest sense is an ideal of service, conceived and dedicated to combating disease, including within its operation all the facilities known to human kind for the alleviation of suffering." M. T. MacEachern.

BERGER'S *Principles and Technique of Oral Surgery*[1] is a volume of 450 pages with 355 illustrations devoted to the more common lesions which are seen by the oral surgeon. The first chapter reviews the general surgical technique including a number of the more popular drugs and antiseptics.

Chapter II deals with examination and diagnosis and is one of the most important portions of the book. It seems that it would serve even a better purpose if the pathology underlying the various lesions were included, as a comprehension of many signs and symptoms is greatly enhanced if the underlying cellular condition is understood.

The general division of inflammations into acute and chronic is timely, as it tends to teach routine habit in differential diagnosis, thereby simplifying the reasoning which finally leads to the correct diagnosis, which is so difficult for the less experienced to acquire.

In the author's treatment of necrosis of the bone, his conservatism is to be commended, as too early removal of sequestra frequently leads to bony deformity which impairs function.

Chapter XIII on cysts contains many good illustrations which seem to indicate that their treatment by enucleation is simple, thereby inviting the more or less inexperienced operator to attempt them, when a complete bony restoration with retention of many teeth could be attained if they were treated after the manner of Partsch.

The chapter on alveolectomy might better have been omitted because it seems to give this pernicious practice the stamp of approval. In a few selected cases it is indicated, and every oral surgeon does the limited operation when it is necessary.

The text is clear and concise and is a valuable addition to our literature. H. A. Potts.

[1] The Principles and Technique of Oral Surgery. By Adolph Berger, D.D.S. London: Claudius Ash, Sons & Co.; Brooklyn, New York: Dental Items of Interest Publishing Co.; 1923.

AN atlas of radiographs[2] is presented in which the makeup and illustrations are excellent. The book consists entirely of illustrations with a short descriptive key text embracing the entire normal skeletal anatomy and nearly all of the commoner pathological conditions, made up as silhouette radiograms showing the outline of soft tissues as well as of bone.

The radiograms are unusually good and are so arranged that normal and pathological illustrations of the same anatomical parts may be compared, although the normal structures occupy the first portion of the book, the fractures the middle, and the diseased structures the last. This is accomplished by a simple method of placing the normal structures on the left (even numbered pages) and the others on the right (odd numbered pages).

I. S. Trostler.

JOHN MUIR and Sir Archibald Reid are issuing a manual[3] of X-ray work with unusually good general makeup, text, and illustrations. Every branch of radiology except therapy is touched upon and the reader is thoroughly introduced to the subject.

The book presents much valuable information for all who are interested in the X-rays. This is particularly true of that part pertaining to X-ray diagnosis, which occupying as it does nearly 300 pages, constitutes the greater and more valuable portion. The subjects are well grouped and there are numerous good comparative tabulations of X-ray findings.

The plates of the various normal and pathological conditions are above the average except those of the thorax, which are nearly all too dark—overexposed—and lack much of fine detail.

That portion of the book which refers to X-ray protection and protective devices deserves special commendation. The book is a valuable addition to any library. I. S. Trostler.

[2] A Descriptive Atlas of Radiographs of the Bones and Joints; For Students and Practitioners. By A. P. Bertwistle, M.B., Ch.B. New York: William Wood and Company, 1924.

[3] A Manual of Practical X-Ray Work. By John Muir, B.Sc., M.B., Ch.B., B.Sc. (Pub. Health), in collaboration with Sir Archibald Reid, K.B.E., C.M.G., M.R.C.S., L.R.C.P., D.M.R.E. (Camb.), and F. J. Harlow, B.Sc., F. Inst. P., A.R.C. Sc., 3d. ed. New York: Paul B. Hoeber, Inc., 1924.

BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

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THE SCIENCE AND ART OF ANÆSTHESIA. By Colonel William Webster, D.S.O., M.D., C.M. St. Louis: The C. V. Mosby Company, 1924.

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FRANKLIN H. MARTIN, Chicago, *Director-General*

FOURTEENTH ANNUAL SESSION, NEW YORK–BROOKLYN, OCTOBER 20–24, 1924
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PLANS FOR THE NEW YORK–BROOKLYN MEETING

THERE will be found in the following pages a preliminary program for the evening meetings of the Fourteenth Annual Session of the Clinical Congress of the American College of Surgeons to be held in New York and Brooklyn, October 20–24, 1924. It will be noted that the meetings on Monday, Tuesday, Thursday, and Friday evenings are to be held in the Ballroom at the Waldorf-Astoria and on Wednesday evening in the Academy of Music in Brooklyn; also that programs have been prepared for special meetings on Tuesday and Thursday evenings in the Empire Room at the Waldorf-Astoria when papers and discussions will deal with subjects of importance to those interested in the surgical aspects of ophthalmology, otology, rhinology, and laryngology.

The preliminary clinical program is being reprinted in this issue. This program, however, is still in a tentative stage and is to be further revised and amplified previous to the meeting so that the final program will fully represent the clinical activities in all departments of surgery in Greater New York. The real program of the Congress is to be issued daily during the session and will give in complete detail a description of the clinics and demonstrations to be given at the several hospitals and medical schools.

The committee in charge of clinics in surgery of the eye, ear, nose, and throat is developing a series of clinical demonstrations to be given each morning at the New York Eye and Ear Infirmary, Manhattan Eye, Ear and Throat Hospital, Bellevue Hospital, and other institutions for the benefit of those surgeons who are particularly interested in these branches of surgery, to provide them with a full program for each day of the session.

An important feature of the clinical program will be found in a series of clinical demonstrations or "dry clinics" in which surgeons, internists, pathologists, roentgenologists and other specialists will participate, to discuss important subjects from all angles, bringing to bear the best thought on those subjects as developed by the several departments of medicine.

General headquarters for the Congress will be established at the Waldorf-Astoria at Thirty-fourth Street and Fifth Avenue, where practically the entire first floor of the hotel has been reserved for the exclusive use of the Clinical Congress—the Ballroom, Astor Gallery, Green, Myrtle and East Rooms, and other large rooms and foyers adjacent thereto. These rooms provide ample space for the evening meetings, business sessions, registration and ticket bureaus, bulletin rooms, etc. Headquarters will be open for registration at 8 a.m. Monday, October 20th, and each morning thereafter at the same hour.

The clinical program Tuesday will be bulletined during Monday afternoon, and reservations for clinic tickets for Tuesday's clinics may be filed late that afternoon.

An application for reduced railway fares on account of this meeting is pending with the railway passenger associations, and it seems assured that a substantial reduction in fares will be granted, applying to all portions of the United States and Canada.

HOSPITAL CONFERENCE

The annual hospital conference will be held Monday and Tuesday, both morning and afternoon, in the Ballroom of the Waldorf-Astoria. It will be noted that the program for this conference, which is published in the following pages, deals intimately with the details of hospital standardization and management. Addresses, demonstrations, round table conferences and general discussions by hospital superintendents, trustees, surgeons, nurses, and others interested in the conduct of hospitals furnish a program of very great interest and practical value, offering solutions for many of the everyday problems and difficulties encountered in hospital management and the care of the patient within the hospital.

At the opening session Monday morning, Dr. Franklin H. Martin, Dirctor-General, will make the annual announcement of the hospitals which appear on the approved list for 1924.

Headquarters for the hospital standardization department and the hospital service bureau of the College, together with the office of Dr. M. T. MacEachern, Associate Director in charge of hospital standardization activities, will be established in the Green Room on the first floor adjacent to general headquarters. All those who are particularly interested in hospital problems are requested to register at hospital standardization headquarters upon arrival in New York. Such headquarters will be open daily during the entire session.

LIMITED ATTENDANCE—ADVANCE REGISTRATION

The rule limiting attendance to a number that can be comfortably accommodated at the clinics must necessarily be strictly enforced at this year's meeting. The limit of attendance is based upon

a survey of the amphitheaters, lecture rooms, and laboratories in the hospitals and medical schools as to their capacity for accommodating visitors. This plan necessitates registration in advance on the part of all who wish to attend. When the limit of attendance has been reached through advance registration, no further applications will be accepted.

Attendance at clinics and demonstrations is controlled by means of special tickets, which plan has proved an efficient means of providing for the distribution of the visiting surgeons among the several clinics and insures against overcrowding, as the number of tickets issued for any clinic is limited to the capacity of the room in which that clinic is given.

REGISTRATION FEE

In order that no financial burden may be imposed upon the members of the profession in the city entertaining the Congress, a registration fee of $5.00 is required of each surgeon attending the clinical meeting, such fees providing the funds with which to meet the expenses of conducting the meeting. A formal receipt for the registration fee is issued to each surgeon registering in advance which receipt is to be exchanged for a general admission card upon his registration at headquarters. This card, which is non-transferable, must be presented to secure clinic tickets and for admission to the evening meetings.

NEW YORK HOTELS AND THEIR RATES

	Minimum Rate for Room with Bath	
	Single	*Double*
Astor, Broadway and 44th St.	$5.00	$8.00
Belmont, Park Ave. and 42nd St.	6.00	8.00
Biltmore, Madison Ave. and 43rd St.	8.00	12.00
Breslin, Broadway and 29th St.	3.50	6.00
Claridge, Broadway and 44th St.	3.50	6.00
Collingwood, 45 West 35th St.	3.50	5.00
Commodore, Lexington Ave. and 42nd St.	5.00	8.00
Gotham, Fifth Ave. and 55th St.	5.00	6.00
Georgian, 42 West 35th St.	4.50	6.00
Herald Square, 116 West 34th St.	3.00	5.00
Imperial, Broadway and 32nd St.	3.00	5.50
Martinique, Broadway and 32nd St.	3.50	5.00
McAlpin, Broadway and 34th St.	4.00	6.00
Murray Hill, Park Ave. and 41st St.	4.00	6.00
Park Avenue, Park Ave. and 32nd St.	4.00	5.00
Pennsylvania, 7th Ave. and 32nd St.	4.50	7.00
Plaza, Fifth Ave. and 59th St.	6.00	8.00
Prince George, 14 East 28th St.	3.00	4.00
Savoy, Fifth Ave. and 50th St.	5.00	7.00
Vanderbilt, Park Ave. and 34th St.	4.00	8.00
Waldorf-Astoria, Fifth Ave. and 34th St.	6.00	8.00
Wolcott, 4 West 31st St.	3.50	5.00
Woodstock, 127 West 43rd St.	3.50	6.00

HOSPITAL CONFERENCE PROGRAM

BALLROOM, WALDORF-ASTORIA HOTEL

Morning Session, October 20, 10 to 12:30

A. J. OCHSNER, M.D., Chicago, President, Presiding

Opening Address of the President.

Presentation of the Official Report of Hospital Standardization for the Year 1924. FRANKLIN H. MARTIN, M.D., Chicago, Director General, American College of Surgeons.

Analysis of the Hospital Standardization Movement During the Past Seven Years. MALCOLM T. MACEACHERN, M.D., Chicago, Associate Director, American College of Surgeons, Director of Hospital Activities.

The University Hospital of Dunedin. PROF. SIR H. LINDO FERGUSON, C.M.G., M.D., Dunedin, New Zealand; Dean of the Faculty of Medicine, University of Otago, New Zealand.

What the New Zealand Division of the British Medical Association Is Doing toward Improving Hospital Efficiency for the Practitioners of Medicine. J. S. ELLIOTT, M.D., Wellington, New Zealand; Chairman, New Zealand Council British Medical Association.

Essentials for the Development and Maintenance of Efficient Hospital Service in Internal Medicine. HARLOW BROOKS, M.D., New York; Professor of Medicine, University and Bellevue Hospital Medical College; President, American College of Physicians.

A Case Record System as a Basis for Appraising Surgical Work (illustrated). C. B. KEENAN, M.D., Montreal, Quebec; Lecturer on Surgery, McGill University Faculty of Medicine; Assistant Surgeon, Royal Victoria Hospital.

The Hospital and the Doctor as Co-operating Factors in Diagnosis. ALLAN CRAIG, M.D., Chicago; Associate Director, American College of Surgeons, Director of State and Provincial Activities.

Guiding Fundamental Principles of Hospital Standardization. REV. C. B. MOULINIER, S.J., Milwaukee; President, Catholic Hospital Association.

General Discussion.

Afternoon Session, 2:00 to 5:00

Errors in Surgical Diagnosis, Avoidable and Unavoidable—as Seen by the Laboratory Man (illustrated). ARTHUR A. EISENBERG, M.D., Cleveland, Ohio; Director of Laboratories, St. John's Hospital.

The History of the Staff Conference. CHARLES A. GORDON, M.D., Brooklyn; Clinical Professor of Obstetrics and Gynecology, Long Island College Hospital.

Staff Conference Demonstration. Staffs of St. Catherine's and Greenpoint Hospitals, Brooklyn.

Standardizing Staff Conference Procedure. ROBERT L. DICKINSON, M.D., New York; Clinical Professor of Gynecology, Long Island College Hospital.

General Discussion.

Morning Session, October 21, 9:30 to 12:30

CHARLES MAYO, M.D., Rochester, Minnesota, President, Presiding

The Relation of the Hospital to the Departments of Radiology and Pathology. GEORGE S. MCREYNOLDS, M.D., Temple, Texas; Oculist and Aurist, King's Daughters' Hospital.

Appraising of Case Records. JOHN A. WOLFER, M.D., Chicago; Assistant Professor of Surgery, Northwestern University Medical School; Adjunct Surgeon, Wesley Memorial Hospital. W. C. DANFORTH, M.D., Evanston, Illinois; Associate Professor of Gynecology, Northwestern University Medical School; Attending Gynecologist and Obstetrician, Evanston Hospital.

Essentials for an Efficient Surgical Service in a Hospital. CARL A. HAMANN, M.D., Cleveland; Professor of Applied Anatomy and Clinical Surgery, Western Reserve University School of Medicine; Visiting Surgeon, St. Vincent's Charity and Cleveland City Hospitals.

Essential Features for the Organization and Operation for Special Clinical Departments in a Hospital—

(a) Ophthalmology.

(b) Oto-Laryngology. GEORGE E. SHAMBAUGH, M.D., Chicago; Professor of Oto-Laryngology, Rush Medical College; Oto-Laryngologist, Presbyterian Hospital.

(c) Obstetrics. HERBERT M. LITTLE, M.D., Montreal, Quebec; Assistant Professor of Obstetrics, McGill University Faculty of Medicine; Obstetrician, Montreal Maternity Hospital.

(d) Genito-Urinary. HENRY JOSEPH SCHERCK, M.D., St. Louis, Missouri; Assistant Professor of Genito-Urinary Surgery, St. Louis University, School of Medicine; Visiting Genito-Urinary Surgeon, St. Louis City Hospital and Genito-Urinary Surgeon, Missouri Pacific Hospital.

Equipment, Organization, and Management of a Physiotherapy Department in a Hospital. ROBERT E. PECK, M.D., New Haven, Connecticut; Director of Physiotherapeutics, Grace Hospital.

The Clinical Value of Physiotherapy in a Hospital (illustrated). HARRY E. MOCK, M.D., Chicago; Assistant Professor of Industrial Medicine, Rush Medical College; Member of Surgical Staff, St. Luke's Hospital.

General Discussion.

Afternoon Session, 2:00 to 5:00

Fundamental Principles of Hospital Administration from an International Viewpoint. E. S. GILMORE, Chicago; Superintendent, Wesley Memorial Hospital; President, American Hospital Association.

Hospital Administration in New Zealand. CHARLES EVANS MAGUIRE, M.D., Auckland, New Zealand; Superintendent, Auckland Hospital.

Round Table Conference conducted by CARL E. BLACK, M.D., Jacksonville, Illinois; Surgeon Passavant Memorial and Our Saviour's Hospitals. Topics for discussion: (1) Reception and Discharge of Patients in Hospitals. (2) Increasing Consultations. (3) Essential Operating Room Records. (4) Wound Results in Operative Cases. (5) Standardizing of Operating Room Technique. (6) The Internist and Hospital Standardization. (7) The Autopsy and Hospital Efficiency. (8) Selection of Medical Staff of a Hospital. (9) Essentials for Filing Case Records. (10) Follow-up and Study of End-Results.

General Discussion.

TENTATIVE PROGRAM FOR EVENING MEETINGS

Presidential Meeting, Monday, October 20—Ballroom, Waldorf-Astoria, 8 P.M.

Address of Welcome: EUGENE H. POOL, M.D., New York, Chairman of New York Committee on Arrangements.

Address of Retiring President: ALBERT J. OCHSNER, M.D., Chicago.

Introduction of Foreign Guests.

Inaugural Address: CHARLES H. MAYO, M.D., Rochester, Minnesota.

The Doctor John B. Murphy Oration in Surgery—The Treatment of Spastic Paralysis and Its Experimental Basis, N. D. ROYLE, M.B., Sydney, Australia; The Significance of the Work, JOHN I. HUNTER, M.D., Ch.M., Sydney, Australia.

Convocation, Friday, October 24—Ballroom, Waldorf-Astoria, 8 P.M.

Conferring of Honorary Fellowships.

Presentation of Candidates for Fellowship.

Presidential Address: CHARLES H. MAYO, M.D., Rochester, Minnesota.

Fellowship Address: WALTER W. CHIPMAN, M.D., F.R.C.S. (Edin.), Montreal, Quebec.

NOTE.—For the meetings on Tuesday and Thursday evenings in the Ballroom of the Waldorf-Astoria and on Wednesday evening in the Academy of Music, Brooklyn, the Executive Committee is preparing a program of interesting papers to be presented by distinguished surgeons from Europe, Australia, New Zealand, United States and Canada. These papers will be discussed by New York and Brooklyn surgeons. The complete program will be published in the October issue of this journal. Among the speakers will be the following:

ALBERT JAMES WALTON, M.S., F.R.C.S., London. England.

H. B. DEVINE, M.D., Melbourne, Australia.

RALPH WORRALL, M.D., Sydney, Australia.

BERTRAM M. BERNHEIM, M.D., Baltimore, Maryland.

SECTION ON SURGERY OF THE EYE, EAR, NOSE, AND THROAT

Tuesday, October 21—Empire Room, Waldorf-Astoria, 8 P.M.

GORDON B. NEW, M.D., Rochester, Minn.: Malignant Tumors of the Pharynx, Including the Nasopharynx.

L. W. DEAN, M.D., Iowa City, Iowa: The Treatment of Chronic Otitic Brain Abscess.

Thursday, October 23—Empire Room, Waldorf-Astoria, 8 P.M.

FREDERICK H. VERHOEFF, M.D., Boston: The Pathology of Glaucoma.

F. PHINIZY CALHOUN, M.D., Atlanta, Georgia: The Operative and Non-Operative Treatment of Glaucoma.

SIR HY. LINDO FERGUSON, C.M.G., M.D., F.R.C.S.I., Dunedin, New Zealand: Subject to be announced.

GENERAL SURGERY, GYNECOLOGY, OBSTETRICS, ORTHOPEDICS, UROLOGY

CLINICS IN NEW YORK HOSPITALS

ROOSEVELT HOSPITAL

Tuesday

CHARLES H. PECK and staff—9. Surgical clinic.
HOWARD C. TAYLOR and staff—9. Gynecological clinic.
G. P. PENNOYER and C. W. LESTER—12. Surgical laboratory demonstration.
J. M. STEINER—12. X-ray demonstration.

Wednesday

JAMES I. RUSSELL and staff—9. Surgical clinic.
WM. CRAWFORD WHITE—12. Surgical laboratory demonstration.
J. M. STEINER—12. X-ray demonstration.

Thursday

CHARLES H. PECK and staff—9. Surgical clinic.
HOWARD C. TAYLOR and staff—9. Gynecological clinic.
E. F. KILBANE—12. Demonstration in urological clinic.

Friday

JAMES I. RUSSELL and staff—9. Surgical clinic.
E. F. KILBANE—12. Demonstration in urological clinic.

ST. VINCENT'S HOSPITAL

Tuesday

SIMON J. WALSH, WILLIAM FORD, JOSEPH BRADY, GEORGE R. STUART, and C. J. MACGUIRE, JR.—9. General surgical clinic.
GEORGE DAVID STEWART, ARTHUR M. WRIGHT, ERNEST FAHNESTOCK, RAYMOND P. SULLIVAN, and EDWARD A. KING—2. Surgery of the chest.

Wednesday

RAYMOND P. SULLIVAN—9. Management of cases of hyperthyroidism.
JOHN ASPELL, WALLACE KRUGLER, JOHN MCGRATH, JAMES P. HENNESSEY, AUGUST JAMES RAGGI—2. Uterine displacements.

Thursday

GEORGE DAVID STEWART, ARTHUR M. WRIGHT, ERNEST FAHNESTOCK, RAYMOND P. SULLIVAN, and EDWARD A. KING—9. Abdominal surgery. Gastric cases.
EDWARD L. KEYES—2. Urological surgery.
REGINALD H. SAYRE and WILLIAM DORAN—2. Orthopedic clinic.

SLOANE HOSPITAL

Gynecological and obstetrical clinics. Demonstrations: Obstetrical and gynecological pathology. Pathological findings in routine autopsies with stillbirths and neonatal deaths. Medical complications occurring in obstetrical hospitals. Pediatrician's problems in obstetrical hospitals. Treatment and end-results of the toxæmias of pregnancy. Fibroids as a complication of obstetrics. End-results of operative procedures on fibroids. End-results of radium and X-ray treatment of fibroids. Some etiological factors in cystocele and rectocele. Hospital rounds and manikin demonstrations of obstetrical operations.

NEW YORK POST-GRADUATE HOSPITAL

Tuesday

JOHN F. ERDMANN—8:30. General surgical clinic.
EDWARD W. PETERSON—2. General surgical clinic.
W. DANNREUTHER—2. Gynecological clinic.
CHARLES OGILVY—4:30. Orthopedic clinic.
F. CARTER—4:30. Demonstration of local anæsthesia.

Wednesday

H. D. FURNISS—9. Gynecological clinic.
L. J. UNGER—10. Demonstration of blood transfusion.
CHARLES GORDON HEYD—2. General surgical clinic.
JAMES N. WEST—2. Gynecological clinic.
CHARLES A. ELSBERG—2:30. Neuro-surgical clinic.
B. W. MOFFAT—4:30. Orthopedic clinic.

Thursday

FRED H. ALBEE—9. Orthopedic clinic.
J. BENTLEY SQUIER—9. Urological clinic.
J. J. MOORHEAD—2. Traumatic surgery.
E. P. WEIGEL—4:30. Orthopedic clinic.

Friday

EDWARD W. PETERSON—9. General surgical clinic.
S. W. BANDLER—9. Gynecological clinic.
JOHN F. ERDMANN—2. General surgical clinic.
CHARLES OGILVY—4:30. Orthopedic clinic.
F. CARTER—4:30. Demonstration of local anæsthesia.

GENERAL MEMORIAL HOSPITAL

Tuesday

W. S. STONE and LLOYD CRAVER—9. Cases of lymphosarcoma, Hodgkin's disease, leukæmia.
W. B. COLEY—9. Cases of long bone sarcoma.

Wednesday

B. J. LEE and FRANK E. ADAIR—9. Cases of various types of mammary carcinoma.
WILLIAM P. HEALY and DR. PULLEN—9. Cases of carcinoma of the uterus and vagina.

Thursday

JAMES EWING—10. Pathological conference, exhibition of interesting specimens of bone tumors.
W. S. STONE and LLOYD CRAVER—10. Discussion of interesting cases for diagnosis and treatment.

Friday

DOUGLAS QUICK and F. JOHNSON—9. Cases of cancer of mouth, lip, and tongue.
WILLIAM P. HEALY and DR. PULLEN—9. Cases of carcinoma of uterus and vagina.

BROAD STREET HOSPITAL

WALTER M. BRICKNER, WALTER G. CRUMP, J. RICHARD KEVIN, ROBERT T. MORRIS, WILLIAM SCHROEDER, JR., and RALPH STEWART—Operative demonstrations and bedside clinics in traumatic and general surgery.
MAXIMILIAN STERN—Urologic operations and cystoscopic demonstrations.

PRESBYTERIAN HOSPITAL

Symposium—Surgery of the Gastro-Intestinal Tract

F. B. St. John and John von Glahn—Hæmorrhage from duodenal ulcer; postmortem studies and a discussion of indications for resection of the pylorus.

A. O. Whipple and Ross Golden—Perforating ulcer of the lesser curvature; X-ray studies and a discussion of indications for radical removal by midgastric resection—Billroth II, Pólya, and the Moynihan operations.

F. B. St. John and A. O. Whipple—Results in radical surgery of the stomach illustrated by follow-up cases.

Ross Golden—Diagnostic points in roentgenology of the stomach and duodenum.

George Draper—Studies in the constitutional make-up of patients with ulcer of the stomach and duodenum.

A. O. Whipple and F. B. St. John—Operative clinic; cases of gastric surgery.

Hugh Auchincloss and A. O. Whipple—Follow-up cases illustrating abdomino-perineal resection for carcinoma of the rectum.

Symposium—Biliary Tract Diseases

Ross Golden—X-ray studies in diseases of the biliary tract.

Ross Golden, Louis Bauman, and A. O. Whipple—Results with calcium tetrabrome phthalein X-ray studies.

A. O. Whipple—Indications for common duct drainage. Follow-up results.

Louis Bauman and D. C. Bull—Liver function tests.

A. O. Whipple—Factors in lowering mortality in biliary tract surgery.

George Draper—Constitutional studies in the diseases of the biliary tract.

A. O. Whipple—Follow-up cases illustrating pancreatic lesions.

Demonstrations

Hugh Auchincloss and Ross Golden—Surgery of the breast and chest. Follow-up results and discussion of X-ray features.

Hugh Auchincloss—Plastic surgery and surgery of hand infections. Follow-up results.

Louis Bauman—Insulin therapy as applied to surgical cases. Discussion of results with calcium tetrabrome phthalein and with liver function tests.

J. Bentley Squier—Urological surgery. Follow-up and operative clinic.

W. B. Parsons, Jr.—Diseases of the thyroid.

J. M. Hanford—Tuberculosis of lymph glands of neck. Cases illustrating follow-up results.

F. T. Van Beuren, Jr.—Acute intestinal obstruction. Discussion of treatment, together with discussion of jejunostomy in relation to ileus.

William Darrach—Fracture clinic.

C. A. Elsberg and Dr. Penfield—Discussion of neurosurgical cases from the standpoint of diagnosis, experimental work, and treatment.

LINCOLN HOSPITAL

Tuesday

William C. White—3. Surgical clinic.

Wednesday

Seth M. Milliken—3. Surgical clinic.

Thursday

Percy H. Williams—3. Gynecological clinic.

ST. LUKE'S HOSPITAL

Tuesday

Walton Martin, William A. Downes, W. S. Schley, N. W. Green, R. W. Bolling, H. H. M. Lyle, F. S. Mathews, John Douglas, M. K. Smith, and E. D. Truesdell—8:30. General surgical clinic.

F. S. Mathews and G. M. Goodwin—10. Goiter cases.

John Douglas—11. Lantern slides demonstrating the diagnosis of subphrenic abscess and collections of fluid below the diaphragm.

Wednesday

Walton Martin, William A. Downes, W. S. Schley, N. W. Green, R. W. Bolling, H. H. M. Lyle, F. S. Mathews, John Douglas, M. K. Smith, and E. D. Truesdell—8:30. General surgical clinic.

M. K. Smith—10. Fracture clinic.

H. H. M. Lyle—10:30. Disabilities of the hand.

H. G. Bugbee, F. E. DuBois and G. F. Hoch—11:15. Exhibition of postoperative urological cases. Lantern slide talk on urological subjects.

Thursday

Walton Martin, William A. Downes, W. S. Schley, N. W. Green, R. W. Bolling, H. H. M. Lyle, F. S. Mathews, John Douglas, M. K. Smith and E. D. Truesdell—8:30. General surgical clinic.

F. C. Wood—10:30. Clinical results of radiotherapy.

F. C. Wood—2:30. Lecture and demonstration on the X-ray plant and methods of measurement of X-rays in the radiotherapeutic department.

Friday

Walton Martin, William A. Downes, W. S. Schley, N. W. Green, R. W. Bolling, H. H. M. Lyle, F. S. Mathews, John Douglas, M. K. Smith and E. D. Truesdell—8:30. General surgical clinic.

T. H. Myers and associates—2. Orthopedic clinic.

Daily

F. C. Wood. Demonstration at the Crocker Laboratory: Artificial production of cancer and other phases of research.

Dr. Brown. Radiological demonstration.

CITY HOSPITAL

Tuesday

Charles G. Child, Jr.—11. Gynecological clinic.

Howard D. Collins—2:30. Abdominal operations.

James Pederson—2:30. Genito-urinary clinic.

Wednesday

Edward Pinkham—11. Gynecological clinic.

Parker Syms—2:30. General surgical clinic, sacral anæsthesia.

Thursday

Lyman W. Crossman and John C. Vaughan—11. General surgical clinic.

Nathan W. Green—2:30. General surgical clinic, local and spinal anæsthesia.

J. Bayard Clark—2:30. Genito-urinary clinic.

Friday

Donald Gordon and Ernest A. Campbell—11. Fracture clinic.

Albert S. Morrow—2:30. General surgical clinic.

NEW YORK HOSPITAL

Tuesday

CHARLES L. GIBSON—9. Operative clinic; gastroduodenal perforations; end-results in chronic appendicitis.
SEWARD ERDMAN—2. Operative clinic; tumors of the colon; high enterostomy for ileus.
D. S. LOWSLEY and staff—2:30. Kidney operations under paravertebral anæsthesia. Demonstration of interesting postoperative cases. Perineal prostatectomy under sacral and parasacral anæsthesia.

Wednesday

E. H. POOL—9. Thyroid operation. Cases illustrating diagnosis, follow-up, and ante-operative therapy.
JAMES M. HITZROT and CLAY RAY MURRAY—2. Fracture clinic, operations and demonstration of cases.
W. M. WEEDEN—2. Empyema clinic.
O. S. LOWSLEY and staff—2:30. Cystoscopy, pyelography. Demonstration of results of operations under regional anæsthesia.

Thursday

CHARLES L. GIBSON—9. Operative clinic; Harris band; pneumococcus peritonitis.
FREDERIC W. BANCROFT—2. Osteomyelitis operation; theoretic considerations. Follow-up.
JOHN A. VIETOR—2. Phlebitis.
O. S. LOWSLEY and staff—2:30. Nephrectomy under paravertebral anæsthesia. Demonstration of interesting pyelograms. Suprapubic prostatectomy under sacral and parasacral anæsthesia.

Friday

E. H. POOL—9. Gastric cases, operations.
PAUL DINEEN—9. Discussion of follow-up.
B. J. LEE—2. Breast operation. Cases illustrating diagnosis of breast lesions. Follow-up cases. Congenital obstructions of bowel.
O. S. LOWSLEY and staff—2:30. Clinic on cancer of the urinary tract, treated by operation and radium and X-ray.

FLOWER HOSPITAL

Tuesday

H. B. SAFFORD—9. Obstetrical clinic.
G. W. LUTTON—2. General surgery.

Wednesday

A. L. SORESI—9. Demonstration in Laboratory of Surgical Research.
W. F. HONAN—2. General surgery.
DR. YOULAND—2. Demonstration of unusual cases from the Department of Surgical Pathology.

Thursday

F. M. SMITH—9. General surgery.
A. L. SORESI—2. General surgery.

Friday

J. H. FOBES—9. Gynecological clinic.
SPRAGUE CARLETON—2. Genito-urinary clinic.
O. R. VON BONNEWITZ—2. Rectal surgery.
L. M. POWELL—2. Demonstration: clinical hæmatology.

Daily

Demonstrations: Anæsthesia, local and general; Laboratory of Surgical Research; Departments of Pathology, Hæmatology and Bacteriology; Roentgenology.

POLYCLINIC HOSPITAL

Tuesday

A. J. QUIMBY—Demonstrations of gastro-intestinal fluoroscopy and roentgen therapy.
J. R. LOSEE—Demonstration of pathological specimens in general and special surgical conditions. Discussion of chemical blood findings in diabetes and kidney diseases in relation to operative hazards.

Wednesday

WILLIAM SHARPE—Discussion of brain injuries and demonstration of operative procedures.
K. W. NEY—Ventricular estimation for determination of intracranial pressure. X-ray demonstration and operative clinic.
A. S. MORROW—Operative clinic with local anæsthesia.
J. P. GRANT—General surgical operations.
C. A. MCWILLIAMS—Discussion of the principles of plastic surgery. Demonstration with patients and lantern slides.
L. D. GAGER—Consideration of the diabetic as a surgical risk.

Thursday

L. J. LADIN—Discussion of extra-uterine pregnancy. Demonstration of the early signs of pregnancy.
C. G. CHILD—Gynecological clinic.
W. WARD—Gynecological clinic.
E. L. KELLOGG, F. C. KELLER, H. R. KUTIL and S. L. CASH—Gastro-intestinal surgery. Operations and discussion of duodenal problems. Bile-tract drainage. Lantern slide demonstration.

Friday

D. A. SINCLAIR, A. R. STEVENS, and DR. REESE—Urological clinic. Topography of the ureter and renal pelvis as outlined by shadowgraph, bougies, ureterograms and pyelograms. Lantern slide demonstration and operations.

METROPOLITAN HOSPITAL

Tuesday

J. H. FOBES and staff—9. Management of pelvic infection in the female. Discussion of the results of curettage in aseptic abortion.
C. B. REED and H. J. FOBES—2:30. Pneumo-ventriculography in hydrocephalus.
C. L. BAGG and RALPH WARD—3:30. Surgical clinic; review of extra-uterine pregnancy.

Wednesday

HENRY SAFFORD—9. Demonstration of fractures of the pelvis complicating pregnancy.
L. S. LOIZEAUX—10. The modern cæsarean operation.

Thursday

J. R. LISA—10. Duodenal ulcer as a complication of pulmonary tuberculosis, autopsy specimens.
G. S. HARRINGTON and staff—2. Compound fractures.

Friday

WILLIAM F. HONAN and staff—10. Demonstrations and operations under the various forms of local, paravertebral, spinal, and splanchnic anæsthesia. Periarterial sympathectomy.
S. CARLETON—2. Urological clinic.
WALLACE B. HOUSE and A. H. BINGHAM—3. Transverse myelitis, neurological and orthopedic clinic.
G. F. RAYNOR, G. G. ORNSTEIN, and M. M. STEINBACH—4. Surgical interference in pulmonary tuberculosis.

BELLEVUE HOSPITAL

Tuesday

R. S. HOOKER, A. V. S. LAMBERT, J. A. MCCREERY, and C. J. MCGUIRE, JR.—9. Operations and exhibition of cases of fractures, thoracic surgery, gastric ulcer, and sarcoma of bone.

FREDERICK W. RICE and HAROLD BAILEY—9. Demonstration of obstetrical cases.

FREDERICK C. HOLDEN, ONSLOW A. GORDON, JR., and EDWIN HOLLADAY—9. Illustrative gynecological operations with discussions on the methods of pre- and postoperative care of the patient. Methods of undergraduate and postgraduate teaching.

DOUGLAS SYMMERS—2. Aspects of anthrax.

J. BRECKSTEIN—2. Study of duodenal morphology.

W. J. RENDICH—2. Study of gastric mucosa.

I. SETH HIRSCH—2. Cæcum-colic sphincteric tract.

Wednesday

JOHN A. HARTWELL—9. Operation on upper abdomen with demonstration of incision and methods of drainage.

FREDERICK W. RICE and HAROLD BAILEY—9. Demonstration of obstetrical cases.

HAROLD SANTEE—2. Demonstration of suspension traction and treatment of fractures.

JOSEPH E. KING—2. Exhibition of cases of brain abscess and other neurosurgical cases.

Thursday

T. A. SMITH, EDWIN BEER, and staff—9. Late results of fractures of neck of femur. Late results of perforated gastric and duodenal ulcers.

FREDERICK C. HOLDEN, ONSLOW A. GORDON, JR., and EDWIN HOLLADAY—9. Illustrative gynecological operations with discussions on the methods of pre- and postoperative care of the patient. Methods of undergraduate and postgraduate teaching.

CARL G. BURDICK and staff—2. End-results in fractures in children with poor anatomical reduction. Empyema, methods of treatment and end-results. Plastic surgery, methods and end-results. Purpura hæmorrhagica, thrombocytopenic type. Results of splenectomy.

Friday

GEORGE D. STEWART, JOHN DOUGLAS, A. M. WRIGHT, R. P. WADHAMS, W. H. BARBER, and GEORGE A. KOENIG—9. Surgical teaching clinic.

EDWARD KEYES—9. Demonstration of urological cases.

FREDERICK C. HOLDEN, ONSLOW A. GORDON, JR., and EDWIN HOLLADAY—9. Illustrative gynecological operations with discussions on the methods of pre- and postoperative care of the patient. Methods of undergraduate and postgraduate teaching.

BRONX HOSPITAL

Tuesday

MAX ROSENTHAL and staff—10. Tracheloplastic operations; hysterectomy, etc.

MARTIN REHLING and staff—2:30. Operations on the kidneys and pelvic organs under local and sacral anæsthesia.

Thursday

A. A. BERG and staff—10. Gastro-enterological clinic.

Friday

H. GRAD and staff—4. Gynecological clinic.

WOMAN'S HOSPITAL

Tuesday

HERMANN GRAD and E. A. BULLARD—9. Gynecological operations.

H. G. BUGBEE and staff—9. Urological clinic.

GEORGE GRAY WARD, JR., and L. K. FARRAR—2. Gynecological operations.

DR. PLAUT—2. Pathological laboratory demonstrations.

W. H. GLAFKE—2:30. Gastro-enterological clinic.

Wednesday

H. E. B. PARDEE—9. Cases of pregnancy complicated with heart disease.

F. A. DORMAN and L. V. LYONS—10. Demonstration of obstetrical ward and delivery room technique.

GEORGE GRAY WARD, JR., and L. K. FARRAR—10. Exhibit of radium cases.

W. T. KENNEDY—10. Radiography of pelvic conditions (Dr. Peterson's technique).

B. H. GOFF—2. History system of the Woman's Hospital.

DR. ALDRIDGE—2. Insufflation clinic.

DR. PLAUT—2. Pathological laboratory demonstrations.

F. A. DORMAN and L. V. LYONS—3. Demonstration of new follow-up system in obstetrics.

Thursday

R. M. RAWLS and W. T. KENNEDY—9. Gynecological operations.

H. G. BUGBEE and staff—9. Urological clinic.

D. BISSELL and B. H. GOFF—2. Gynecological operations.

DR. PLAUT—2. Pathological laboratory demonstrations.

R. E. HERENDEEN—2:30. X-ray diagnosis and therapy.

Friday

HERMANN GRAD and E. A. BULLARD—9. Gynecological operations.

GEORGE GRAY WARD, JR., and L. K. FARRAR—2. Gynecological operations.

DR. PLAUT—2. Pathological laboratory demonstrations.

W. H. GLAFKE—3:30. Gastro-enterological clinic.

FIFTH AVENUE HOSPITAL

Tuesday

GEORGE W. ROBERTS—9. General surgery.

L. R. KAUFMAN—9. Urology.

WILLIAM F. HONAN—2. General surgery.

ANSON H. BINGHAM—2. Orthopedic surgery.

Wednesday

WALTER GRAY CRUMP—9. General surgery.

LEON S. LOIZEAUX—9. Obstetrical clinic.

WILLIAM F. HONAN—2. General surgery.

Thursday

WILLIAM L. SNEED—9. Orthopedic surgery.

SPRAGUE CARLETON—9. Urology.

WILLIAM H. BISHOP—9. General surgery.

BISSELL PALMER—2. Oral surgery.

Friday

L. R. KAUFMAN—9. Urology.

Daily

T. DRYSDALE BUCHANAN and staff. Demonstrations in anæsthesia.

D. S. D. JESSUP and staff. Conferences in surgical pathology.

LEWIS GREGORY COLE and staff. X-ray demonstrations.

NEW YORK INFIRMARY FOR WOMEN AND CHILDREN

Tuesday

MARIE CHARD—9. Gynecological clinic.
HELEN BALDWIN, EMILY LEWI, and CONNIE GUION—9. Medical aspects of surgical cases.
CAROLINE FINLEY—9. Use of endocrines in obstetrics.

Wednesday

MARIE CHARD and EMMA SELKIN-ARONSON—9. General surgery.
ELISE L'ESPERANCE—9. Gross and microscopic pathology.
NANCY JENISON—9. Fluoroscopy of chest and after bismuth meals.
LEE EDWARD—9. Demonstration of obstetrical cases.

Thursday

ELISE L'ESPERANCE—9. X-ray department demonstration.
MARY PUTNAM—9. Surgery in pediatrics.
WILHELMINA RAGLAND—9. Treatment of toxæmias of pregnancy.

Friday

ANNA HUBERT—2. Surgical clinic.
GEORGIA REID—2. Use of Gwathmey method of anæsthesia during labor.

Days to be announced

AGNES C. VIETOR (Boston). The anatomic basis for the study of visceral ptosis, lantern slide and cadaver demonstration of the normal variations in the later positions of the prenatal viscera, with special reference to the status at term; basis redundancy of the colon as a whole; variable redundancy; four lines of location of the sigmoid colon; three types of sigmoid colon; surgical landmarks for identifying and tracing the sigmoid colon no matter what its location or type; migrations and displacements of colon loops; developmentally fixed loops; spontaneous development of angulation, kinking, and torsion; spontaneous compensation; anatomic points favoring mechanical obstruction and stasis; congenital dilatation; two types of undescended cæcum; shape and position of the resting or empty stomach; four stages of the distended stomach, characteristic shape and position in each stage; changes in antrum, pylorus, and first portion of the duodenum.

GOUVERNEUR HOSPITAL

Tuesday

A. E. SELLENINGS—2. Surgical clinic.

Wednesday

W. H. W. KNIPE—2. Demonstration of normal and abnormal obstetrical cases.
L. J. LADIN—3. Gynecological clinic.

Thursday

A. E. SELLENINGS—2. Surgical clinic.

Friday

E. L. KELLOGG—2. Surgical clinic.

MANHATTAN MATERNITY HOSPITAL

J. C. EDGAR, AUSTIN FLINT, and WILLIAM M. FORD—9 daily. Demonstrations of indoor and outdoor service, history records and filing system, nursing, social service and prenatal methods, operating room technique.

NEW YORK NEUROLOGICAL INSTITUTE

Tuesday

C. A. ELSBERG, A. S. TAYLOR, J. H. KENYON, and BYRON STOOKEY—9. Operations on the central nervous system.

Wednesday

C. A. ELSBERG, A. S. TAYLOR, J. H. KENYON, and BYRON STOOKEY—9. Operations on the central nervous system.

Thursday

C. A. ELSBERG, A. S. TAYLOR, J. H. KENYON, and BYRON STOOKEY—9. Operations on the central nervous system.

BETH ISRAEL HOSPITAL

Tuesday

ISADORE SEFF—9. Paravertebral anæsthesia in empyema.
CHARLES GOODMAN and staff—2. General surgical clinic.
E. MOSCHOWITZ—2. Pathology of appendicitis.
CHARLES GOTTLIEB and DR. TAYLOR—2. Demonstration of interesting roentgenograms.
DR. SCAL—3. Radium treatment in cancer of tongue, goiter, and diseases of tonsils.

Wednesday

RICHARD LEWISOHN—9. Surgical treatment of gastric and duodenal ulcers.
HARRY E. ISAACS—10. Acute hæmorrhagic pancreatitis.
HARRY E. ISAACS and staff—2. General surgical clinic.
RICHARD LEWISOHN and staff—2. General surgical clinic.
M. KAHN—2. Insulin and intarvin in surgical diabetes.
DR. PREISER—2. Fluoroscopy of gastro-intestinal tract.

Thursday

L. J. LADIN—9. Demonstration of early signs of pregnancy. Discussion of extra-uterine pregnancy.
MEYER R. ROBINSON—10. Lantern slide demonstrations of the pathological anatomy of tubal pregnancy.
I. C. RUBIN—11. Diagnostic and therapeutic value of uterine insufflation.
HERMAN LORBER—11. Presentation of cases treated with radium.
L. J. LADIN and staff—2. General surgical clinic.

Friday

ABRAHAM L. WOLBARST—9. Exhibit of wax models demonstrating pathological lesions of the verumontanum and vesical sphincter.

MT. SINAI HOSPITAL

A. A. BERG and staff—General surgical clinic.
EDWIN BEER and staff—General surgical clinic.
C. A. ELSBERG and staff—General surgical clinic.
A. V. MOSCHCOWITZ and staff—General surgical clinic.
P. W. NATHAN—Orthopedic clinic.
LEOPOLD JACHES—X-ray demonstrations.

ST. MARY'S HOSPITAL

Tuesday

STAFF—9. Malformations and deformities in children. Demonstrations of non-operative cases, specimens, etc.

Friday

STAFF—9. General surgical clinic.

LENOX HILL HOSPITAL

FRANZ TOREK and staff. Carcinoma of the mouth.
HERMANN FISCHER and staff. Local anæsthesia in operations on the upper abdomen. Hæmostasis in prostatectomy. Plastic for artificial anus.
DEWITT STETTEN and staff. Cholecystectomy without drainage. Inguinal hernia technique.
CARL EGGERS and staff. Chest suppuration.
GUSTAV SEELIGMANN and staff. Combination of surgery and radium in the treatment of carcinoma of the uterus.
FRANK R. OASTLER and staff. The use of radium at the menopause. The use of X-ray in the treatment of fibroid tumors of the uterus. The advantage of proper blood chemistry in the treatment of hyperemesis gravidarum. The advisability of extreme dissections in the treatment of cystocele and rectocele.
WILLIAM H. STEWART and staff. Latest developments in the roentgenographic examination of the gall bladder and kidney. Some refinements in the roentgenographic diagnosis of fractures of the skull.
GEORGE L. ROHDENBURG and staff. Demonstration of the Kahn test. Salt metabolism in neoplasia. Development of the microcystic ovary.

FORDHAM HOSPITAL

Tuesday

F. FLYNN and staff—9. General surgery.
A. H. HARRIGAN and staff—2. General surgery.

Wednesday

J. H. KENYON and staff—9. General surgery.
E. R. CUNNIFFE and staff—2. General surgery.
J. H. TELFAIR and staff—2. Obstetrical clinic.

Thursday

ALEXANDER NICOLL and staff—2. General surgery.

Friday

S. W. BOORSTEIN and staff—9. Orthopedic clinic.
R. E. WALSH and staff—2. General surgery.

MISERICORDIA HOSPITAL

FRANCIS E. BUTLER—Orthopedic clinics. End-results of operative treatment in poliomyelitis.
JOSEPH A. DEVLIN—Operations on and demonstration of pelvic tumor cases.
ANTHONY H. HARRIGAN—Gall-bladder and stomach cases.
EDWARD F. KILBANE—Supernumerary ureters with ectopic openings. Symptomatology, urethral and renal calculi.
WILLIAM W. MAVER. Demonstration by X-ray films of atypical cases.
ROBERT C. SCHLEUSSNER. Casual findings encountered in the routine laboratory examination of appendices.
ALEXANDER H. SCHMITT. Complications of pregnancy and labor, management and end-results.

RECONSTRUCTION HOSPITAL

JOSEPH A. BLAKE and associates—9, daily. Demonstration of the operation of the clinic for industrial accidents and diseases. Exhibition of cases illustrating methods of treating fractures.

NEW YORK ORTHOPEDIC HOSPITAL

Orthopedic operations by the staff, daily at 8. Outpatient clinics, daily at 1:30.

HOSPITAL FOR RUPTURED AND CRIPPLED

Tuesday

ROYAL WHITMAN and staff—8:30. Hospital rounds.
W. B. COLEY, C. J. BURDICK, and staff—8:30. Operative hernia clinic.
ROYAL WHITMAN and staff—1. Demonstration of the abduction treatment for fracture of the neck of the femur; also the reconstruction operation for ununited fracture and for arthritis deformans at the hip.
F. E. ADAIR—2. Demonstration of types of umbilical, femoral, and inguinal herniæ.

Wednesday

J. P. HOGUET and F. E. ADAIR—9. Operative hernia clinic. Demonstration of postoperative cases.

Thursday

PERCY ROBERTS and staff—8:30. Joint operations.
ROYAL WHITMAN and staff—2. Demonstration of the operative treatment of structural scoliosis.

SKIN AND CANCER HOSPITAL

Tuesday

C. A. MCWILLIAMS. Demonstration of plastic surgery and operations for cancer.

Wednesday

FRANZ TOREK. Demonstration of plastic surgery and operations for cancer.

Thursday

GEORGE SEMKEN. Demonstration of plastic surgery and operations for cancer.

Friday

H. H. M. LYLE. Demonstration of plastic surgery and operations for cancer.

BETH DAVID HOSPITAL

Tuesday

LEO BUERGER—9. Urological clinic.

Wednesday

JULIUS JARCHO—9. Obstetrical clinic.
LEO BUERGER—2. Urological clinic.
CHARLES GOTTLIEB—2. X-ray clinic.

Thursday

L. MILLER KAHN—9. General surgery.
MAX ROSENTHAL—2. Gynecological clinic.

Friday

LOUIS DROSIN—9. Obstetrical clinic.
L. J. LADIN—2. Gynecological clinic.

ROCKEFELLER INSTITUTE

ALEXIS CARREL and ALBERT H. EBELING—Cinematographic demonstration of tissue growth.
JAMES B. MURPHY—Experimental analysis of the action of X-ray on cancer.
WADE H. BROWN, LOUISE B. PEARCE, and C. M. VAN ALLEN—The relation of the thyroid to the malignancy of a transplanted neoplasm.
HIDEYO NOGUCHI—Yellow fever.
PEYTON ROUS—Physiological implications in cholelithiasis.

LEBANON HOSPITAL

Tuesday

A. J. RONGY—9. Gynecological clinic.
G. SEELIGMANN—2:30. Gynecological clinic.
RALPH WALDO—2:30. Gynecological clinic.

Wednesday

HENRY ROTH—9:30. Surgical clinic.
L. MILLER KAHN—9:30. Surgical clinic.

Thursday

A. J. RONGY—9. Gynecological clinic.
G. SEELIGMANN—2:30. Gynecological clinic.
RALPH WALDO—2:30. Gynecological clinic.

Friday

HENRY ROTH—9:30. Surgical clinic.
L. MILLER KAHN—9:30. Surgical clinic.

ITALIAN HOSPITAL

Tuesday

C. SAVINI and V. FANONI—9. General surgery.
V. SELLARO and A. SCATURRO—2. Gynecology.

Wednesday

F. E. PARODI and G. MUNNA—9. General surgery.

Thursday

S. SALADINO and D. VIGGIANO—9. General surgery.
D. PETILLO and M. CASO—2. Genito-urinary clinic.

Friday

V. COCUZZA and C. TOMASULO—9. Gynecology.

HARLEM HOSPITAL

Wednesday

THOMAS CHERRY—10. Radium in gynecology.
JOHN F. CONNORS—2. Intestinal obstruction.
HENRY S. PASCAL—2. Biliary fistula.

Friday

THOMAS CHERRY and ARTHUR STEIN—10. Gynecological operations and demonstrations.
JOHN F. CONNORS and PERRY S. BOYNTON—2. Treatment of fractures.

PENITENTIARY AND WORKHOUSE HOSPITALS

Tuesday

EDWARD C. BRENNER—9. Prostatectomies, perineal and suprapubic, under sacral and parasacral anæsthesia.

Wednesday

EDWARD C. BRENNER—9. Gynecological clinic.

Thursday

EDWARD C. BRENNER—9. Diseases of the biliary tract demonstrating the surgical pathology so frequently found in drug addicts hitherto unmentioned in literature.

KNICKERBOCKER HOSPITAL

Wednesday

JOHN DOUGLAS, C. A. FRINK, C. G. BURDICK, J. V. BOHRER, A. S. ARMSTRONG, and G. A. KOENIG—9. End-results of head injuries.

Thursday

JOHN DOUGLAS, C. A. FRINK, C. G. BURDICK, J. V. BOHRER, A. S. ARMSTRONG, and G. A. KOENIG—9. General surgical operations, traumatic and emergency cases.

Friday

JOHN DOUGLAS, C. A. FRINK, C. G. BURDICK, J. V. BOHRER, A. S. ARMSTRONG, and G. A. KOENIG—9. End-results in complicated leg fractures.

ST. BARTHOLOMEW'S HOSPITAL

Tuesday

J. M. LYNCH—8:30. General surgical clinic.

Wednesday

AUSTIN FLINT—8:30. Gynecological clinic.
A. CRUMP—2. Medico-surgical cases.

Thursday

J. M. LYNCH—9. General surgical clinic.
E. L. KELLOGG—2. General surgical clinic.

FRENCH HOSPITAL

J. P. HOGUET—End-results in gastric surgery.
PERCY R. TURNURE—Results of operative and X-ray treatment in sarcoma of the long bones.

LYING-IN HOSPITAL

STAFF—Obstetrical operations and demonstrations of interesting cases each afternoon.
J. T. GWATHMEY—Demonstration of obstetrical analgesia.
J. R. LOSEE—Demonstration of interesting pathological specimens in the museum.

HOSPITAL FOR JOINT DISEASES

HENRY W. FRAUENTHAL and associates—Daily clinics showing cases of obliterating endarteritis. Cases of congenital dislocation of the hip cured and under treatment. Cases of detached semilunar cartilage in the knee joint cured without operation. Club foot cases cured and under treatment. Cases of infantile paralysis treated by massage, electricity, and muscle education.

ST. MARK'S HOSPITAL

Tuesday

BENJAMIN T. TILTON—3. Surgical clinic.

Wednesday

VICTOR C. PEDERSEN—11. Urological clinic.

Thursday

WILLIAM A. WILSON—11. Urological clinic.

CLINICS IN BROOKLYN HOSPITALS

LONG ISLAND COLLEGE HOSPITAL

Tuesday

JOHN O. POLAK, ALFRED BECK, and staff—9. Gynecological and obstetrical clinic.

Wednesday

EMIL GOETSCH—9. Goiter clinic, demonstration of cases.
S. POTTER BARTLEY—9. Fracture clinic.
ROBERT F. BARBER—2. Demonstration of varicose vein cases.

Thursday

JOHN O. POLAK, ALFRED BECK, and staff—9. Gynecological and obstetrical clinic.
HENRY H. MORTON, HOMER E. FRASER, and staff—3. Genito-urinary clinic.

METHODIST EPISCOPAL HOSPITAL

Tuesday

THOMAS B. SPENCE, HENRY F. GRAHAM, CHARLES H. GOODRICH, and H. T. LANGWORTHY—9. General surgical clinic.
O. P. HUMPSTONE and staff—9. Obstetrical clinic.

Wednesday

A. H. BOGART and ROGER DURHAM—9. General surgical clinic.
O. P. HUMPSTONE and staff—9. Obstetrical clinic.
E. B. SMITH—9. Pathological conference.
WESLEY H. WALLACE—9. X-ray treatment.
J. C. GRAHAM—9. Radium treatment.

Thursday

THOMAS B. SPENCE, HENRY F. GRAHAM, CHARLES H. GOODRICH, and H. T. LANGWORTHY—9. General surgical clinic.
O. P. HUMPSTONE and staff—9. Obstetrical clinic.
WESLEY H. WALLACE—9. X-ray treatment.
J. C. GRAHAM—9. Radium treatment.

Friday

RUSSELL S. FOWLER and HAROLD K. BELL—9. General surgical clinic.
O. P. HUMPSTONE and staff—9. Obstetrical clinic.

WYCKOFF HEIGHTS HOSPITAL

Tuesday

JOHN L. BAUER—9. General surgical clinic.
RUSSELL S. FOWLER—2. General surgical clinic.

Wednesday

JOHN HORNI and ARMIN J. SIBBEL—9. General surgical clinic.
CHARLES J. PFLUG—2. General surgical clinic.

Thursday

JOHN L. BAUER—8. General surgical clinic.
RUSSELL S. FOWLER—10. General surgical clinic.
THURSTON H. DEXTER—2. Pathological conference.
RUDOLPH F. HERRIMAN—3. Obstetrical clinic.

Friday

JOHN HORNI and ARMIN J. SIBBEL—9. General surgery.

KING'S COUNTY HOSPITAL

Tuesday

E. H. FISKE—9. General surgical clinic.
HENRY M. MILLS—10. Demonstration of obstetrical conditions.
HOMER E. FRASER and CHARLES S. COCHRANE—2. Genito-urinary clinic, demonstration of unusual cases.

Wednesday

WILLIAM PFEIFFER—9. Gynecological clinic.
FRANKLIN B. VAN WART—2. Demonstration of orthopedic cases and of corrective apparatus.
RALPH C. WILLIAMS—2. Demonstration of orthopedic cases and of corrective apparatus.

Thursday

JOSEPH TENOPYR—9. Demonstration of the treatment of fractures.

Friday

RUSSELL M. ROME—9. General surgical clinic.

ST. MARY'S HOSPITAL

Tuesday

W. V. PASCUAL and T. M. BRENNAN—9. General surgical clinic.
J. G. WILLIAMS—12. X-ray therapy, high voltage treatment with demonstration of iontoquantimeter measurement of dosage.

Wednesday

J. R. KEVIN and J. P. MURPHY—9. General surgical clinic.
J. G. WILLIAMS—12. X-ray therapy, high voltage treatment with demonstration of iontoquantimeter measurement of dosage.
R. B. ANDERSON—2:30. Urological operations under caudal and transsacral anæsthesia.

Thursday

W. V. PASCUAL and T. M. BRENNAN—9. General surgical clinic.
J. G. WILLIAMS—12. X-ray therapy, high voltage treatment with demonstration of iontoquantimeter measurement of dosage.
V. L. ZIMMERMANN—2. Emergency obstetrical operations.
SURGICAL STAFF—2. Dry clinic, general surgery.

Friday

J. R. KEVIN and J. P. MURPHY—9. General surgery.
J. G. WILLIAMS—12. X-ray therapy, high voltage treatment with demonstration of iontoquantimeter measurement of dosage.
J. C. MACEVITT and J. P. GLYNN—2. Gynecological clinic.

BROOKLYN CANCER RESEARCH HOSPITAL

WILLIAM FRANCIS CAMPBELL, HOWARD T. LANGWORTHY, L. P. VAN WINKLE, and EMIL F. KOCH—Tuesday, 2. Cancer clinic: Cancer of the bladder, results of radium treatment; roentgen therapy in cancer; methods of typing cancer.

BROOKLYN HOSPITAL

Tuesday

W. A. SHERWOOD and J. H. LONG—9. General surgical operations.
R. W. WESTBROOK—9. General surgical operations.
MARY H. COMBS—9. Demonstration: Social service department.
N. P. RATHBUN and staff—1. Genito-urinary clinic.
G. H. V. HUNTER and DONALD MCKENNA—2. Orthopedic operations.
JOHN E. JENNINGS—2. Dry clinic: cases of chronic duodenitis in relation to biliary infections.
SIDNEY SMITH—3. Demonstration: results of radium in gynecological cases.

Wednesday

JOHN E. JENNINGS and E. K. TANNER—9. Gall-bladder surgery.
R. H. POMEROY and staff—9. Gynecological and obstetrical clinic.
N. P. RATHBUN and staff—9. Diagnostic clinic in urology; cystoscopy; urography; demonstration of ureteral strictures.
RUTH INGRAHAM—2. X-ray demonstration of surgical conditions.

Thursday

W. A. SHERWOOD and J. H. LONG—9. General surgical clinic.
W. H. CARY—9. Demonstration of sterility studies.
G. H. V. HUNTER and DONALD MCKENNA—9. Orthopedic operations.
H. A. FISHER—9. Syphilis therapy clinic; salvarsan; familial syphilis; follow-up system.
N. P. RATHBUN and staff—1. Genito-urinary clinic.
CALVIN B. COULTER—2. Demonstration of pathological material.
W. H. FIELD—2. Diagnostic clinic, general surgery.

Friday

JOHN E. JENNINGS and E. K. TANNER—9. Operative clinic: surgery of the thyroid.
N. P. RATHBUN and W. F. MCKENNA—9. Urological operations.
W. A. SHERWOOD and staff—11. Surgical staff conference (review of the work of the previous week.)
W. A. SHERWOOD and staff—2. Diagnostic clinic: surgical out-patient department.

JEWISH HOSPITAL

Tuesday

JOHN LINDER—9. General surgical clinic.
LEO SCHWARTZ—2. Gynecological clinic.
MAX LEDERER—2. Pathological conference.

Wednesday

WILLIAM LINDER—9. General surgical clinic. Demonstration of new methods of local anæsthesia.
ADOLPH BONNER—2. Gynecological clinic.
M. G. WASCH—2. Roentgenological demonstration.

Thursday

JOHN LINDER—9. General surgical clinic.
LEO SCHWARTZ—2. Gynecological clinic.
MAX LEDERER—2. Pathological conference.

Friday

WILLIAM LINDER—9. General surgical clinic.

BUSHWICK HOSPITAL

Tuesday

W. E. LIPPOLD and M. B. BERGMANN—9. Gynecological clinic, operations.
A. M. JUDD or PHILIP E. SMITH—11. Gynecological clinic, operations.
JOSEPH B. L'EPISCOPO—2. Orthopedic clinic.

Wednesday

GEORGE H. REICHERS and A. V. P. FARDELMANN—9. General surgical operations.
NATHAN ADLER, WILLIAM C. JAYNE, or ISIDOR TEPLITZ—2. Obstetrical clinic.

Thursday

RUSSELL M. ROME and HECTOR W. BENOIT—9. General surgical operations.
GERARD KASPER and HARRY LIPTON—11. General surgical operations.

Friday

RICHARD C. WEITHAS and GEORGE H. PALMER—10. Genito-urinary clinic.

ST. CATHERINE'S HOSPITAL

Tuesday

DANIEL A. MCATEER—9. General surgery.
D. GEORGE BODKIN—10. General surgery.

Wednesday

JOHN F. GRIFFIN—9. Urological clinic.
JOHN M. SCANNELL—9. General surgery; local anæsthesia: demonstration of direct blood transfusion, method, apparatus and technique.
MARTIN L. BODKIN—10. Proctological clinic.
M. E. MARTEN and E. H. NIDISH—2. Pathological demonstration.

Thursday

FRANK D. JENNINGS and D. E. MCMAHON—9. General surgery.
CHARLES A. GORDON, EDWARD A. FLEMING and JOSEPH A. DRISCOLL—9. Gynecological clinic.

Friday

DANIEL A. MCATEER—9. General surgery.
JOHN M. SCANNELL—9. General surgery; local anæsthesia.
D. GEORGE BODKIN—10. General surgery.

CONEY ISLAND HOSPITAL

Tuesday

VICTOR A. ROBERTSON—2. General surgical clinic, diagnosis and treatment of the more common fractures, including the application of calipers and Steinmann pin; pre-operative and postoperative study of surgical cases.

Wednesday

JOHN A. SHIELDS—2. Gynecological clinic; diagnosis and treatment of abortion and chronic pelvic infections.

TRINITY HOSPITAL

WILLIAM FRANCIS CAMPBELL and HOWARD T. LANGWORTHY—Thursday, 2. General surgical clinic.

ST. CHRISTOPHER'S HOSPITAL

HERBERT C. FETT—Tuesday, 8. Orthopedic clinic.

ST. PETER'S HOSPITAL

Tuesday

JOSEPH F. TODD—8:30. Diagnostic and operative gynecological clinic.
GORDON GIBSON—10:30. Diagnostic and operative clinic, prolapsus uteri.
J. STURDIVANT READ—3. Diagnostic and operative urological clinic.

Wednesday

THOMAS M. BRENNAN and WM. M. ENNIS—8:30. Diagnostic and operative clinic, demonstrations.

Thursday

FREDERICK C. PAFFARD and JAMES J. SHAY—8:30. Diagnostic and operative clinic, surgery of the upper abdomen.
JOHN D. RUSHMORE and LORNE MCD. RYAN—10:30. Diagnostic and operative clinic, general surgery.

Friday

GORDON GIBSON—10:30. Diagnostic and operative clinic, prolapsus uteri.

PECK MEMORIAL HOSPITAL

Tuesday

JOHN F. RANKIN—9. General surgical and gynecological clinic.
ROBERT WOOD—9. Obstetrical clinic.

Wednesday

WILLIAM PFEIFFER—9. Obstetrical clinic.
GEORGE H. ILER—10. General surgical clinic.

Thursday

THEODORE VOSSELER—9. General surgical clinic.
ONSLOW A. GORDON, JR.—9. Obstetrical clinic.

Friday

CHARLES COCHRANE—9. General surgical clinic.

GREENPOINT HOSPITAL

Tuesday

ANGELO L. SORESI—9. General surgical clinic.

Wednesday

CHARLES A. GORDON—9. Gynecological clinic.
JOHN M. SCANNELL—9. General surgical clinic.

Thursday

JOHN M. SCANNELL—9. General surgical clinic.

Friday

CHARLES A. GORDON—9. Gynecological clinic.

HOLY FAMILY HOSPITAL

Tuesday

JAMES M. DOWNEY—9. General surgical clinic.
EDWARD MORRIS—2. Gynecological clinic.

Wednesday

WILLIAM PFEIFFER—9. Gynecological clinic.

Thursday

EDWIN H. FISKE—9. General surgical clinic.

CUMBERLAND HOSPITAL

Tuesday

WILLIAM L. HEEVE—9. General surgical clinic.
WILLIAM C. DURRIN—2. Gynecological clinic.

Wednesday

JOHN F. RANKEN—9. General surgical clinic.
FREDERICK R. MEEKS—2. Gynecological clinic.

Thursday

HERBERT S. DUCRET—9. General surgical clinic.
MARCUS F. SEARLE—2. Gynecological clinic.

Friday

ROBERT L. WOOD and GEORGE S. OGDEN—9. Obstetrical clinic.

UNITY HOSPITAL

Tuesday

A. M. JUDD. Interesting gynecological operations.
ONSLOW GORDON, JR. Operations during pregnancy.

Wednesday

GEORGE I. MILLER. Several cases of blood transfusion. Demonstration of direct blood transfusion instruments. Abdominal operations.

Thursday

RALPH M. BEACH. Interesting gynecological operations.

Friday

GEORGE I. MILLER. Operations on the gastro-intestinal tract. Direct blood transfusion.

ST. JOHN'S HOSPITAL

Tuesday

H. BEECKMAN DELATOUR—9. General surgery.
STANLEY B. THOMAS—2. General surgery.

Wednesday

GEORGE F. SAMMIS—9. General surgery.
ALFRED W. WHITE—2. Obstetrics.

Thursday

WILLIAM H. RANKIN—9. General surgery.
HAROLD K. BELL—2. General surgery.

Friday

WARREN L. DUFFIELD—9. General surgery.
JOHN C. KNAPP—2. Roentgenological demonstrations.

NORWEGIAN HOSPITAL

Tuesday

E. H. FERRIS—8:30. General surgery.

Wednesday

HENRY F. GRAHAM—8:30. General surgery.

Thursday

E. W. SKELTON—8:30 General surgery.

Friday

LOUIS STORK—8:30. General surgery.

MIDWOOD SANITARIUM

Tuesday

BURT D. HARRINGTON and CAMERON DUNCAN—10. General surgery and gynecology.

Wednesday

BURT D. HARRINGTON and CAMERON DUNCAN—10. General surgery and gynecology.

Thursday

BURT D. HARRINGTON and CAMERON DUNCAN—10. General surgery and gynecology.

Friday

BURT D. HARRINGTON and CAMERON DUNCAN—10. General surgery and gynecology.

U. S. NAVAL HOSPITAL

Tuesday

CAPTAIN NORMAN J. BLACKWOOD and staff—10. Genito-urinary diseases.

Thursday

CAPTAIN NORMAN J. BLACKWOOD and staff—10. Roentgenological demonstrations.

Friday

CAPTAIN NORMAN J. BLACKWOOD and staff—10. Diathermy and electrotherapeutics.

HOUSE OF ST. GILES THE CRIPPLE

WILLIAM S. HUBBARD, FRANK F. LYNE, CHARLES D. NAPIER, FRANK B. RING, JACQUES C. RUSHMER—Thursday, 3. Demonstration of orthopedic cases.

SURGERY OF THE EYE, EAR, NOSE, AND THROAT

CLINICS IN NEW YORK HOSPITALS

NEW YORK POST-GRADUATE HOSPITAL

Tuesday

T. J. HARRIS—1:30. Nose and throat clinic.
W. C. MCFARLAND—2:30. Otological operations.
MARTIN COHEN—3:30. Eye clinic. Ptosis operation, Heisrath-Khunt operation, extirpation of lachrymal sac, bilateral advancement, Elliot's trephining operation, cataract extraction.

Wednesday

DUNCAN MACPHERSON—1:30. Nose and throat clinic.
ROBERT L. LOUGHRAN—2:30. Otological operations.
A. EDWARD DAVIS—3:30. Demonstration of administration of lens antigen extract for prevention of cataract; operations for squint and ptosis.

Thursday

T. J. HARRIS—1:30. Nose and throat clinic.
W. C. MCFARLAND—2:30. Otological operations.
MARTIN COHEN—3:30. Eye clinic.

Friday

DUNCAN MACPHERSON—1:30. Nose and throat clinic.
ROBERT L. LOUGHRAN—2:30. Otological operations.
E. M. ALGER—3:30. Eye clinic.

LENOX HILL HOSPITAL

RUDOLF C. DENIG and staff. Treatment of fresh eye burns. Operations on the eye.
ERNST F. KRUG and staff. Study of after-cataract cases with the Gullstrand slit lamp.
FELIX COHN and staff. Oto-laryngological clinic.
JOHN D. KERNAN and staff. Bronchoscopic treatment of lung abscess.

FORDHAM HOSPITAL

Tuesday

CHARLES GRAEF and staff—2. Ophthalmology.

Thursday

W. M. DUNNING, S. H. BASCH, and staff—9. Oto-laryngological clinic.

POLYCLINIC HOSPITAL

Tuesday

F. M. STEPHENS, J. M. SMITH, E. D. NEER, GEORGE E. DAVIS, and E. R. FAULKNER—2. Radical mastoid operation for chronic suppurative mastoiditis. Demonstrations on aural operations on the cadaver. Functional tests of hearing and labyrinthine diseases. Demonstration of sinus operations on the cadaver.

Wednesday

G. E. DAVIS—2. Functional tests of hearing and labyrinthine diseases.

Thursday

J. M. SMITH—2:30. Radical mastoid operation for chronic suppurative mastoiditis.

Friday

G. H. BELL, J. A. KEARNEY, and C. E. MCDANNALD—Eye clinic. Demonstration of selected clinical cases and operations.
E. D. NEER—3. Demonstration of aural operations on cadaver.

CORNELL UNIVERSITY MEDICAL COLLEGE

Tuesday

BERNARD SAMUELS, C. A. DRAKE, and M. L. BERLINER—2. Ophthalmological clinic. Demonstration of Gullstrand slit lamp.

Friday

ROBERT G. REESE and GEORGE W. VANDERGRIFT—2. Ophthalmological clinic.

KNAPP MEMORIAL EYE HOSPITAL

ARNOLD KNAPP and associates—2, daily. Operations on the eye. Demonstrations of cases.

GOUVERNEUR HOSPITAL

W. W. CARTER—Tuesday, 2. Plastic operations for nasal deformities. Bone transplantation for nasal deformities.

BELLEVUE HOSPITAL

Tuesday

WESLEY C. BOWERS—10. Radical operation on mastoid with demonstration of improvement of hearing rather than lessening; presentation of cases.

J. D. KERNAN—10. Bronchoscopic treatment of lung abscess versus external surgery, with exhibition of technique and presentation of cases.

STAFF—10. Nose and throat clinic. Rounds, dressings, demonstration of interesting cases.

J. WOLFF—10. Eye clinic. After-treatment and follow-up.

S. A. AGATSTON—2. Eye clinic. Recession operation.

C. G. COAKLEY and associates—2. Otological operations and demonstration of cases.

Wednesday

J. W. FOWLKES—10. Demonstrating the Bellevue method of tonsillectomy and ligation of vessels. Presentation of cases one year after operation showing results.

STAFF—10. Nose and throat clinic. Rounds, dressings, demonstration of interesting cases.

S. AGATSTON—10. Eye clinic. After-treatment and follow-up.

C. G. COAKLEY and associates—2. Otological operations and demonstration of cases.

C. H. MAY—2. Advancement operations.

Thursday

R. T. ATKINS—10. External operations on the paranasal sinuses with presentation of cases.

STAFF—10. Nose and throat clinic. Rounds, dressings, demonstration of interesting cases.

C. H. MAY—10. Eye clinic. After-treatment and follow-up.

C. G. COAKLEY and associates—2. Otological operations and demonstration of cases.

J. WOLFF—2. Cataract extraction with safety flap.

Friday

STAFF—10. Nose and throat clinic. Rounds, dressings, demonstration of interesting cases.

W. B. DOHERTY—10. Eye clinic. After-treatment and follow-up.

W. B. DOHERTY—2. Enucleation with implant of cartilage.

C. G. COAKLEY and associates—2. Ear, nose, and throat clinics.

NEW YORK EYE AND EAR INFIRMARY

Tuesday

CLYDE E. MCDANNALD, GEORGE H. BELL, CONRAD BERENS, W. B. DOHERTY, W. R. BEDINGFIELD, J. A. RENWICK, KELLY COX, and B. L. MILTON—10. Eye clinic. After-treatment and follow-up.

CONRAD BERENS—10. Lantern slide demonstration of intra-ocular and orbital tumors.

STAFF—10. Otological clinic, rounds, dressings, etc.

E. D. BURCHALL—10. Lantern slide demonstrations and exhibitions of specimens of normal and abnormal temporal bones.

GEORGE H. BELL—2. Operations on the eye.

CLYDE E. MCDANNALD—2. Reese resection for strabismus. Reese ptosis operation. Extirpation of lachrymal sac.

CONRAD BERENS—2. Suture in cataract extraction. Pleating muscle operation for strabismus.

ROBERT LEWIS, T. L. SAUNDERS and assistants—2:15. Otological operations and demonstrations.

Wednesday

ROBERT G. REESE, BEN WITT KEY, AQUIN S. KELLY, C. A. DRAKE, I. D. KRUSKEL, W. B. ALLEN, SHOBER SMITH, KELLY COX, B. L. MILTON, W. B. BEDINGFIELD, and J. A. RENWICK—10. Eye clinic. After-treatment and follow-up.

GEORGE S. DIXON—10. X-ray localization of foreign bodies in the globe. Demonstration of X-ray plates of mastoiditis and sinusitis.

STAFF—10. Otological clinic, rounds, dressings, etc.

ROBERT G. REESE and AQUIN S. KELLY—2. Cataract extraction in the capsule. Reese resection for strabismus. Reese ptosis operation. Iridectomy under a conjunctival flap for glaucoma. Modified enucleation with gold ball implant. Capsulectomy with Reese knife. Extraction of complicated cataract under a conjunctival flap.

E. B. DENCH, CHARLES E. PERKINS, FRED WHITING, and assistants—2:15. Otological operations and demonstrations.

Thursday

JOHN M. WHEELER, WEBB W. WEEKS, J. H. DUNNINGTON, R. L. DURFEE, and A. B. REESE—10. Eye clinic. After-treatment and follow-up.

E. D. BURCHALL—10. Lantern slide demonstrations and exhibitions of specimens of normal and abnormal temporal bones.

STAFF—10. Otological clinic, rounds, dressings, etc.

JOHN M. WHEELER—2. Operations for contracted orbit and cicatricial ectropion.

WEBB W. WEEKS—2. Trephine for chronic glaucoma. Recession for strabismus.

ROBERT LEWIS, T. LAURENCE SAUNDERS, JOHN MCCOY, and assistants—2:15. Otological operation and demonstration.

Friday

FRANCIS W. SHINE, BERNARD SAMUELS, R. L. DURFEE, and A. B. REESE—10. Eye clinic. After-treatment and follow-up.

B. SAMUELS and M. L. BERLINER—10. Demonstration of Gullstrand slit lamp, Van Hess differential pupilloscope, and Koeppe's eye microscope.

G. S. DIXON—10. Localization of foreign bodies in the globe. Demonstration of X-ray plates of mastoiditis and sinusitis.

STAFF—10. Otological clinic, rounds, dressings, etc.

F. W. SHINE—2. Motais' operation for ptosis.

BERNARD SAMUELS—2. Reese resection for strabismus. Reese ptosis operation. Enucleation with gold ball implant.

E. B. DENCH, CHARLES E. PERKINS, FREDERICK WHITING, and assistants—2:15. Otological operation and demonstration.

ST. VINCENT'S HOSPITAL

Tuesday

FRANCIS J. QUINLAN—2. Exhibition of nose and throat cases; discussion with view to operation.

Wednesday

JOSEPH O'CONNELL—2. Operations and clinical demonstration of mastoid cases.

ST. MARK'S HOSPITAL

Thursday

G. J. E. TIECK—1:30. Operations for nasal deformities.

MANHATTAN EYE, EAR AND THROAT HOSPITAL

Tuesday

FREDERICK M. LAW—10. Diagnostic value of X-ray in sinus and mastoid conditions.
STAFF—10. Demonstration of otological cases.
STAFF—10. Demonstration of nose and throat cases.
STAFF—10. Demonstration of eye cases.
WENDELL C. PHILLIPS, E. P. FOWLER and staff—2. Otological operations and demonstration of cases.

Wednesday

ANDREW A. EGGSTON—10. Blood transfusion in lateral sinus thrombosis.
STAFF—10. Demonstration of otological cases.
STAFF—10. Demonstration of nose and throat cases.
STAFF—10. Demonstration of eye cases.
ARTHUR B. DUEL, P. D. KERRISON and staff—10. Otological operations and demonstration of cases.

Thursday

FREDERICK M. LAW—10. Diagnostic value of X-ray in sinus and mastoid conditions.
STAFF—10. Demonstration of otological cases.
STAFF—10. Demonstration of nose and throat cases.
STAFF—10. Demonstration of eye cases.
JOHN R. PAGE, JOHN D. RICHARDS and staff—2. Otological operation and demonstration of cases.

Friday

HARRIS A. HOUGHTON—10. Mastoiditis in diabetics.
STAFF—10. Demonstration of otological cases.
STAFF—10. Demonstration of nose and throat cases.
STAFF—10. Demonstration of eye cases.
JOHN B. RAE, W. C. MCFARLAND and staff—2. Otological operations and demonstration of cases.

Days to be Announced

HARMON SMITH, SAMUEL MCCULLAGH, E. ROSS FAULKNER, and JOHN E. MACKENTY—Rhinological and laryngological clinics.
EDGAR THOMSON, CHARLES KINNEY, JOHN SHANNON, and HERBERT WOOTTON—Ophthalmological clinics.
GUILFORD ROBINSON—Radium treatment of diseases of eye, ear, nose and throat.
A. A. EGGSTON—Pathological demonstrations.
C. J. IMPERATORI—The technique of bronchoscopy.
H. A. HOUGHTON—Relationship of metabolism to diseases of the nose, throat and ear.

METROPOLITAN HOSPITAL

Wednesday

C. C. BOYLE—2. Transplantation of beef cartilage into sclera. Radical mastoid.
J. E. TYTLER—3:30. Rhinological and laryngological clinic.

FIFTH AVENUE HOSPITAL

Wednesday

L. E. HETRICK—2. Otological clinic.
WESTLEY M. HUNT—2. Rhinological and laryngological clinic.

Friday

DEWAYNE HALLETT—9. Ophthalmological clinic.
HAROLD FOSTER—2. Laryngological clinic.
JOHN W. WHEELER—2. Ophthalmological clinic.

ST. LUKE'S HOSPITAL

Tuesday

C. W. CUTLER, ALFRED WIENER, ISAAC HARTSHORNE and staff—2. Operations on the eye.
E. B. DENCH—2. Ear clinic, demonstration of cases.

Wednesday

A. P. VOISLAWSKY, W. M. HUNT, M. H. MERRIMAN, and L. T. PERRAULT—2:30. Operative nose and throat clinic.

Thursday

A. P. VOISLAWSKY, W. M. HUNT, M. H. MERRIMAN, and L. T. PERRAULT—2. Results of tonsillectomy.
E. B. DENCH and staff—2:15. Otological operations.

Friday

C. W. CUTLER, ALFRED WIENER, ISAAC HARTSHORNE and staff—2. Eye Clinic.

MT. SINAI HOSPITAL

Tuesday

ISADORE FRIESNER and staff—9:30. Demonstration of otological and neurological cases and operations.
S. YANKAUER—2. Operative nose and throat clinic, bronchoscopy.

Wednesday

J. WOLFF—2. Cataract extraction with conjunctival safety flap.
K. SCHLIVEK—2. Plastic operation for ectropion.
C. BARNERT—2. Demonstration of block anæsthesia of the ciliary plexus.
I. GOLDSTEIN—2. Extirpation of lachrymal gland.

Thursday

ISADORE FRIESNER and staff—9:30. Demonstration of otological and neurological cases and operations.
S. YANKAUER and staff—2. Bronchoscopies and œsophagoscopies.

Friday

ISADORE FRIESNER and staff—9:30. Demonstration of otological and neurological cases and operations.
S. YANKAUER and staff—2. Nose and throat operations.

CITY HOSPITAL

Wednesday

DANIEL S. DOUGHERTY—2:30. Oto-laryngological clinic, operations and follow-up.

Thursday

W. WHITEHEAD GILFILLAN—2:30. Ophthalmological clinic.

Friday

DANIEL H. WIESNER and PERRY BARTLETT HOUGH—2:30. Ophthalmological clinic.

HARLEM HOSPITAL

L. M. HUBBY—Thursday, 10. Tonsillectomy. Modified radical mastoid operation.

LEBANON HOSPITAL

M. D. LEDERMAN and I. M. HELLER—Friday, 2:30. Oto-laryngological clinic.

BETH ISRAEL HOSPITAL

Friday

S. J. KOPETZKY—9. Pathology of middle ear infections.
A. A. SCHWARTZ—10. Cases of labyrinthine disease.
FELIX COHN and staff—2. Oto-laryngological clinic.
S. J. KOPETZKY and staff—3. Otological clinic.

NEW YORK INFIRMARY FOR WOMEN AND CHILDREN

ANNA BELCHER—Friday, 2. Nose and throat clinic.

FLOWER HOSPITAL

Tuesday

L. E. HETRICK—9. Otological clinic.
E. S. MUNSON—2. Ophthalmological clinic.

ITALIAN HOSPITAL

Wednesday

M. LOMBARDO and T. R. PAGANELLI—2. Eye clinic.

Friday

S. LEVY and J. PAGANELLI—2. Ear, nose, and throat clinic

ST. MARY'S HOSPITAL

STAFF—Wednesday, 9. Tonsillectomies.

BETH DAVID HOSPITAL

S. J. KOPETSKY—Tuesday, 2. Otological clinic.

KNICKERBOCKER HOSPITAL

J. EDGAR WELCH—Tuesday, 3. Tonsillectomies.

CLINICS IN BROOKLYN HOSPITALS

BROOKLYN EYE AND EAR HOSPITAL

Tuesday

FRED D. BAILEY and J. J. MADDEN—2. Demonstration: the Gullstrand lamp and corneal microscope.

Wednesday

GEORGE E. DEELY—2. Operations for squint, cataracts, etc.

Thursday

W. C. BRAISLIN—2. Radical mastoid.

Friday

CLAUDE G. CRANE—2. Demonstration: Barany examination of the ear, with demonstration of cases.

ST. CATHERINE'S HOSPITAL

Tuesday

G. G. FISHER—1. Ear, nose, and throat clinic.

Wednesday

S. H. DECOSTE—1. Ear, nose, and throat clinic.

Thursday

G. G. FISHER—1. Ear, nose, and throat clinic.

Friday

G. G. FISHER—1. Ear, nose, and throat clinic.

PECK MEMORIAL HOSPITAL

Tuesday

J. ALEXANDER STEWART—11. Nose and throat clinic.

Wednesday

ROYAL A. ABBOTT—9. Nose and throat clinic.

ST. PETER'S HOSPITAL

EDWARD R. DORNEY—Tuesday, 3. Nose and throat clinic.

U. S. NAVAL HOSPITAL

CAPTAIN NORMAN J. BLACKWOOD and staff—Wednesday, 10. Eye, ear, nose, and throat diseases.

WYCKOFF HEIGHTS HOSPITAL

ROBERT L. MOORHEAD and HARRY MEYERSBURG—Friday, 2. Nose and throat clinic.

LUTHERAN HOSPITAL

Tuesday

ALEXANDER GILLIGAN—9. Submucous resection of nasal septum, sitting and prone positions, local and general anæsthesia.

Wednesday

ALEXANDER GILLIGAN—9. Tonsillectomy and adenectomy, local and general anæsthesia, Sluder technique.

Thursday

ALEXANDER GILLIGAN—9. Correction of nasal deformities via the columella route.

Friday

ALEXANDER GILLIGAN—9. Exenteration of ethmoid. Puncture and irrigation of maxillary antrum.

CUMBERLAND HOSPITAL

Thursday

J. A. STEWART—1:30. Nose and throat clinic.

Friday

ROYAL A. ABBOTT—2. Nose and throat clinic.

HOLY FAMILY HOSPITAL

GEORGE E. DEELY—Friday, 9. Ear, nose, and throat clinic.

KINGS COUNTY HOSPITAL

JOHN W. DURKEE—Wednesday, 10. Otological clinic; demonstration of unusual ear conditions.

CONEY ISLAND HOSPITAL

LEFFERTS A. MCCLELLAN—Thursday, 2. Special surgical clinic, devoted to nose and throat operations; removal of tonsils and adenoids.

BROOKLYN HOSPITAL

C. G. CRANE, F. H. LASHER, and J. M. TAYLOR—Wednesday, 1:30. Operative clinic in oto-laryngology. Demonstration of the œsophagoscope and bronchoscope.

THE MARITIME PROVINCES SECTIONAL MEETING

THE sectional meeting of the Clinical Congress of American College of Surgeons for the Maritime Provinces of Canada was held in conjunction with the annual meeting of the Prince Edward Island Medical Society in Charlottetown, Prince Edward Island, on July 9 and 10, 1924, with headquarters and registration rooms at the Victoria Hotel. All scientific sessions were held in the Strand Theatre and the clinics in the local hospitals. The attendance was large and the program interesting and instructive. The chairman of the Maritime committee, Dr. Alexander MacNeil, of Summerside, presided at all the sessions. The meeting was exceedingly well conducted through arrangements made by Dr. Jenkins and other members of the profession, who are to be congratulated upon their efficient organization and work.

At the meeting of the Fellows of the College held in the Strand Theatre at 4:30 p. m., July 9, the following Maritime Committee was elected for next year:

Chairman—George H. Murphy, Halifax

Secretary—Philip Weatherbe, Halifax

Counselors—George A. B. Addy, St. John; Stephen Rice Jenkins, Charlottetown

It was decided to meet next year in Halifax

The following visiting speakers were present: Dr. Frank Lahey, Boston; Dr. A. T. Bazin, Montreal; Dr. David W. MacKenzie, Montreal; Dr. C. B. Keenan, Montreal; Dr. M. T. MacEachern, Chicago; and Dr. Allan Craig, Chicago.

On July 10, the members of the Prince Edward Island Medical Society entertained the Fellows of the College and their wives at a delightful dinner and dance at the Beach Grove Inn.